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U. S. Bureau of medicine and surgery.
Annual report of the surgeon-general, U. S. navy
In cover rec'd
Serial
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1895/96

REPORT

OF

THE SURGEON-GENERAL,

U. S. NAVY.

NAVY DEPARTMENT,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., October 1, 1896.

SIR: In obedience to instructions contained in Department's letter of July 8, 1896, I have the honor to report the operations of this Bureau for the last fiscal year, accompanied by a set of annual estimates for the fiscal year ending June 30, 1898, and statistical report showing the health of the Navy for the year 1895. The report embraces a statement of the condition of the naval hospital fund, the naval medical establishment, and other matters of interest pertaining to the duties of the Bureau of Medicine and Surgery.

NAVAL HOSPITAL FUND

The condition of this fund is as follows:

Balance on hand July 1, 1895	$339, 505. 60
Transferred to the credit since July 1, 1895	96, 566. 72
Credit by appropriation for fiscal year 1896	20, 000. 00
	456, 072. 32
Expended since July 1, 1895	141, 242. 99
Balance on hand June 30, 1896	314, 829. 33

APPROPRIATIONS.

No increase in annual appropriations has been asked for.

Estimates have been submitted for two ambulances for use at the naval hospitals at Portsmouth, N. H., and Mare Island, Cal., where they are urgently needed; the ambulance at the naval hospital, Mare Island, having been condemned as worn out and of obsolete type.

An estimate of $1,000 for the cemetery at the United States naval hospital at Brooklyn, N. Y., is submitted, the medical officer in charge of the above hospital having urgently represented the necessity for placing this cemetery in good condition.

NAVAL HOSPITALS.

Naval hospital, Portsmouth, N. H.—No improvements have been made at this hospital during the past year, with the exception of making minor repairs where necessary to the woodwork of the hospital building, and improving and putting in order the grounds of the hospital inclosure.

Repairs to the steam-heating plant are now being made, and this work will soon be completed.

Naval hospital, Chelsea, Mass.—During the past year the roof of the hospital building has been reslated, and new copper has replaced copper and tin over a portion of the roof; new copper conductors and gutters have been supplied. All outside woodwork has been repaired and painted. The roofs of the medical director's house and adjoining veranda have been repaired and woodwork of building renovated. Minor repairs have been made to the ward for contagious diseases, also to laundry and stable.

Naval hospital, Brooklyn, N. Y.—Owing to the repairs and improvements now being made at this hospital, an account of which is found in another part of this report, there were relatively few patients under treatment during the past year, the number being limited by frequent transfers to other naval hospitals.

Besides the special repairs above referred to, minor repairs to grounds and outbuildings have been made, two wrought-iron gates have been erected at entrance to hospital grounds, and the gatehouse has been renovated and enlarged.

Naval hospital, Philadelphia, Pa.—The sanitary improvements of this hospital have been continued during the past year, and it will now compare favorably with the most advanced of our civil and military establishments.

Repairs on north wing of building are completed, and the wards occupied. A modern operating room has been fitted and thoroughly equipped for the aseptic performance of operations. All of the old sanitary fittings, including water-closets, bathtubs, sinks, and wash basins have been removed and modern fixtures introduced. The installation of the electric light throughout the entire building has been completed, and gives much satisfaction. As the steam heating plant is not sufficient for properly heating the entire building during cold weather, since the occupation of the north wing, the Bureau will take steps toward having the system modified to meet the conditions now existing.

Naval hospital, Washington, D. C.—No material changes have been made during the past year in the hospital or grounds. The paving of Tenth street east, which has been commenced, will add much to the comfort of patients. The hospital is now being furnished with a modern operating room, properly equipped for the performance of operations, and it is hoped that it will be completed at an early date.

Naval hospital, Norfolk, Va.—During the past year much has been accomplished toward a complete rehabilitation of this hospital. The roof has been repaired and painted and steam heat and combination electric fixtures have been introduced. The south wing is now being made ready for the reception of patients, and when completed it will double the capacity of the hospital. A new operating room and lavatory, etherizing, sterilizing, dressing, surgical, and receiving rooms have been added, and these will soon be fitted with modern surgical appliances. Two new 30-horsepower boilers (built at the Navy-Yard) have been placed in the boiler house, and the latter has been repaired and painted. The wagon shed has been repaired and refloored with cement concrete and a new hospital wharf and boathouse have been erected.

Besides the above repairs, considerable work has been done in repairing the roads, paths, and brick walks, and in trenching, ditching, and draining within the hospital grounds.

Naval hospital, Pensacola, Fla.—No repairs have been made to the hospital buildings during the past year. In order, however, to prevent deterioration to buildings and to have the hospital thoroughly equipped for immediate occupation, should the emergency arise, a complete renovation of the hospital and outbuildings has been commenced, under the supervision and direction of the Bureau of Yards and Docks, and will soon be completed.

Naval hospital, Mare Island, Cal.—Many minor repairs have been made at the hospital during the past year. The entire basement area of the hospital, with the exception of the two dining-room floors, has been paved with artificial stone, and all basement woodwork and walls have been painted, and wooden and iron plates placed over the lines of the pipes.

There has been a general renovation of grounds and outbuildings, drains and sewers.

Naval hospital, Yokohama, Japan.—Minor repairs have been made to the buildings during the past year and the grounds of the hospital have been placed in excellent condition. All of the woodwork of the detached ward has been renovated and the walls replastered.

The supply of water has been increased by the building of a cistern with a capacity of 15,000 gallons, affording an additional protection against fire.

IMPROVEMENTS AND REPAIRS, NAVAL HOSPITAL, NEW YORK.

The work under contract at this establishment has progressed slowly, as shown by the weekly reports received and on file to May 2, 1896.

Fraudulent work on boundary wall was reported by laborers employed by contractor on April 11 and 21, 1896. These reports were forwarded officially for investigation, and, being found correct, all work was stopped April 28, 1896, and a board ordered by the Department, consisting of Civil Engineers U. S. G. White and C. C. Wolcott, U. S. N., and Mr. A. W. Lane, foreman, department of yards and docks, to examine and report upon all work done under the contract, to determine whether any fraudulent work had been done in parts other than the boundary wall heretofore examined.

The contract for work referred to was made July 9, 1895, and work commenced in conformity with specifications July 17, 1895, as stated in last report, and if the terms of the contract had been fulfilled the entire work should have been completed in six calendar months. The delay has greatly interfered with the duties of the hospital and caused general discomfort to officers and the few patients kept there under treatment.

The report of the board, submitted and dated June 16, 1896, having been carefully considered, the Department directed, July 21, 1896, in view of the matters brought to light concerning the work done under the contract dated July 9, 1895, under the provisions of said contract, the same to be declared forfeited on the part of the contractor, notifying him and each of his bondsmen to that effect. This was immediately done by registered letters, all duly acknowledged.

Permission was obtained July 22, 1896, to have the work required under contract for repairs and improvements at the naval hospital, Brooklyn, N. Y., completed under two contracts, as follows:

1. For making good the defective work on new boundary wall.
2. For making good the defective work, and completion of improvements and repairs on the hospital.

In obedience to instructions, advertisements were issued August 20, 1896, for proposals for work specified under section 2, in accordance with plans and specifications approved by the Department, and advertisements issued August 25, 1896, for work specified under section 1, also according to plans and specifications approved by the Department.

Bids to be opened, respectively, September 21, 1896, and September 28, 1896.

Five bids were received to complete the work at the United States naval hospital, Brooklyn, N. Y., as follows, viz:

Thomas Dwyer, 106 East One hundred and sixteenth street, New York	$47,000
D. S. Hess & Co., 876 Broadway, New York	38,900
Arthur H. Weeks, 2150 Fulton street, Brooklyn	32,000
M. Gibbons & Son, 318 Columbia street, Brooklyn	29,975
Isaac A. Walker & Son, 1213 Filbert street, Philadelphia	26,491

The firm of Isaac A. Walker & Son, lowest bidders, have at present under consideration the question of scaling their bid within the limit of the available appropriation ($26,000).

Two bids were received for making good the defective work on boundary wall, as follows, viz:

Thomas Dwyer, 106 East One hundred and sixteenth street, New York	$15,120
M. Gibbons & Son, 318 Columbia street, Brooklyn	9,375

A contract for the work in question can not be awarded to the lowest bidder until the Bureau is informed of the result of the legal proceedings recently commenced against contractor and bondsmen in connection with contract dated July 9, 1895.

The improvements contemplated under these contracts consist in extensive alterations in the interior construction of the hospital building, including a complete renovation of the woodwork, flooring, plastering work, and paint work.

Certain rooms, designated for the accommodation of sick officers, by rearrangement are made into suites of three rooms each, so that each officer shall have, instead of a single room, which in some instances is smaller than is considered desirable, two rooms with bathroom and closet attached. By judicious arrangement this very great addition to the comfort of the occupant is accomplished with the minimum sacrifice of other considerations, the total air space allotted to each patient under the former arrangement being considerably increased in these apartments made en suite. Rearrangement of medical officers' quarters is also carried out in a similar manner.

Complete renovation of the entire system of water supply and drains has been made, with the substitution of new and improved bath tubs of enameled iron, and of marble basins with modern connections and traps throughout, together with a considerable increase in the number thereof. The old catch basins are eliminated and direct sewer connections made.

Although electricity is the illuminating medium employed, it is provided that the building be repiped for gas, so that in the event of the failure of the current from any cause no embarrassment would result.

A new feature is the installation of a modern-type electric elevator of ample capacity to accommodate a ward litter with patient and attendants.

The steam capacity of the boiler house is considerably augmented by the addition of a horizontal steel return tubular boiler, designed to carry a gauge pressure of 80 pounds. Additional radiators are also distributed throughout the building.

The corridors on the first floor are to be laid in vitrified tile of neat design, and the main stairway replaced by a new one.

In addition to improvements in hospital building, there is to be erected in the courtyard a three-story structure of brick, in which will be located the mess hall, dispensary, chapel, and operating room.

The operating room is to be 25 by 45 feet, well lighted by a large central skylight. The floor is to be of smooth vitrified tile, with a gentle slope from all sides to a central drain, of most approved construction. The walls will be finished in cement, and a curved glazed tile base will make connection between the floor and the walls. Adjoining the operating room, and with it constituting the entire third floor, are the etherizing, recovering, and sterilizing rooms, and also accommodations for medical officers to prepare themselves for operating.

Across the driveway, in the rear of the courtyard building, a two-story brick structure is designed, on the first floor of which is located the kitchen, with steam cooking apparatus and two large modern ranges in the equipment. On the second floor a commodious smoking room for convalescents is provided, having a "kosmocrete" floor. Both buildings are to be electric lighted, steam heated, and artificially ventilated.

By act of Congress approved June 10, 1896, brick material was allowed to be used for construction of ward authorized by act approved July 26, 1894, and a similar additional ward allowed to increase needed capacity of hospital, making an amount of $50,000 available for the purpose, the same to be paid from that portion of the naval hospital fund accruing from the sale of naval hospital grounds to the city of Brooklyn, and placed to the credit of the naval hospital fund, in pursuance of the provisions of the act approved July 2, 1890.

In view of the proposed increased accommodations for the sick, a board was recommended June 17, 1896, to determine upon and report to the Department the most desirable sites in the hospital grounds for the wards about to be erected under authority of the act referred to, and the approximate size and character of each ward; also to consider, in selecting the sites, the question of sunlight, accessibility to main building and court building under construction, preservation of architectural effect of hospital proper, and necessity of preserving harmony of all other buildings within the inclosure.

After a careful examination of maps and drawings, hospital buildings and grounds, the board recommended a building about 50 feet wide by 155 feet long, two stories high, with basement, built of buff face brick and white marble or other light-colored stone trimmings; the building to be located parallel to the south wing of the main building, and distant about 65 feet; thus receiving the sun's rays obliquely upon one side in the morning and upon the other side in the afternoon.

The recommendation of the board was approved by the Department.

Information regarding character of building, etc., was furnished architects in New York and Washington, upon their application, with permission to prepare preliminary drawings and estimates, at their own risk and expense.

Satisfactory preliminary plans and specifications for proposed new wards were submitted by the firm of Smithmeyer & Didden, architects, of Washington, D. C., based upon the report of the board above mentioned, and authority was requested of the Department, September 29, 1896, to have them present plans and specifications in detail, and to advertise for the work when such plans and specifications shall have been submitted and approved.

Upon receipt of Department's letter, dated October 2, 1896, granting the desired authority, the architects were immediately notified to prepare the plans in question.

EXTENSION OF NAVAL HOSPITAL, WASHINGTON, D. C.

The necessity for increased accommodations for the sick at this establishment is apparent.

The records of the hospital for the five years 1891 to 1895, inclusive, show 36 admissions of officers, with a total of 1,265 sick days; other admissions, sailors and marines, number 528. Patients are received at this hospital chiefly from the navy-yard and marine headquarters, but from time to time they are transferred here from other hospitals, from coast survey vessels, and from other vessels, foreign or belonging to our own Navy, which may be in port; also old sailors and marines on the retired list who have no suitable home and when taken ill find a refuge here.

The officers attached to the navy-yard and marine headquarters number about 50, while the number of sailors and marines is about 240. Besides the above, there are in and about Washington 250 or more officers, active and retired, liable to need hospital accommodations and treatment.

The situation of the hospital is excellent, occupying an entire square of land on four streets, having thus abundant sunlight and fresh air. The elevation above the navy-yard is inconsiderable, but sufficient to make a very great change perceptible in the condition of malarial patients transferred. The mere change from the one place to the other has sometimes sufficed to put a stop to an attack of malarial fever.

There is but one separate room in which a sick officer can be isolated. Additional accommodations should be provided, so that the whole of the two principal floors could be allotted to patients, the lower or main floor to officers, and the second floor to the enlisted men. The medical officers on duty should be lodged in an annex, which could be easily built within the present grounds and in connection with the hospital proper, and an appropriation with this object in view should be submitted at an early date.

NAVAL HOSPITAL, WIDOWS ISLAND, MAINE.

The history of this hospital has been given in full in previous reports, and a bill has been prepared and submitted to the Department, for approval and transmission to Congress, to dispose of the property as soon as it can be done on satisfactory terms, and the proceeds derived from the sale devoted to the renovation of such other naval hospitals as require to be placed in a modern sanitary condition. Minor repairs are continued, to keep the building in as good a state of preservation as possible.

HOSPITAL MAPS AND PLANS.

Necessary directions have been given to prepare for the files of the Bureau complete maps showing lines of water supply, sewerage, heating, gas and electric lighting of all buildings and grounds of the different naval hospitals, as follows, viz:

1. Location of all water mains, noting material, size, length, and connections.
2. Location of sewers, brick or pipe, size and length.
3. Lighting: Number and location of gas and electric lamps, gas mains, and electric-light wiring.
4. Location of telephone wires, stations, and connections, and of hydrants, fire-alarm stations, and buildings.

5. Heating: System employed, location of steam pipes and radiators.

This work became essential in order to carry on duty intelligently at the various establishments, to prevent damage, and facilitate repairs.

Blue prints of plans when received are forwarded to the particular hospital to which they belong, with directions to have them placed on file with symbols used for easy reference, and to report to the Bureau when alterations are necessary, by emergency or otherwise, so that they can be made on the maps, in accordance with scale, with date of order authorizing the change.

The scale used for grounds is 100 feet to the inch, and of buildings one-fourth of an inch to the foot.

Thework has been finished and plans submitted of hospital buildings and grounds at New York, Philadelphia, and Norfolk, and blue prints have been forwarded to these hospitals and the medical officers on duty instructed to familiarize themselves with the subjects considered. Plans for other hospitals will be transmitted as soon as received.

Complete sets of hospital maps and plans are sent to the Naval Museum of Hygiene for exhibit and study. The value of such plans will be readily understood by everyone who has had any experience in hunting for connections or leaks in old buildings and grounds without plans for guidance.

CEMETERIES AT NAVAL HOSPITALS.

The cemeteries of the several naval hospitals have had very little done to them since the war, and are in no way creditable to Government establishments.

Special appropriations will be required for each one to place them in such a condition that they can be cared for in the future by the hospital force.

The sum of $1,000 was allowed in the appropriations of present fiscal year for the complete renovation of the naval cemetery at Mare Island, California, and the sum of $1,000 has been submitted in estimates for next fiscal year, to be expended on the cemetery at naval hospital, New York.

For labor and material for widening of approaches, and repairing and painting all gates and fences; for making graveled roads and paths, building walls where necessary, properly grading the whole area, and planting appropriate shrubbery.

These cemeteries are visited annually on Decoration Day by representatives of patriotic societies, and should be placed in good condition, and kept so.

A uniform record of burials has been adopted for all hospitals.

NAVY-YARDS.

Navy-yard, Portsmouth, N. H.—The health record of this station has been excellent, no diseases of a contagious or infectious nature having occurred. The total number of sick under treatment was 126, and number transferred to hospital 36.

The yard is in need of a modern system of sewerage, a better supply of water, and the introduction of an electric-light plant.

Navy-yard, Boston, Mass.—The health of this yard during the past year has been satisfactory. The total admissions to the sick list have been 137, and of these 41 were invalided to hospital. A single case of epidemic catarrh of mild type emphasizes the disappearance of the disease which has been so prevalent of late years, and but one case of measles occurred. Two cases of tuberculosis pneumonica acuta were invalided to hospital. The injuries to workmen employed in the yard have been few in number and none were of a serious nature.

The statistics of vaccination performed during the year show very clearly the necessity for its unremitting employment. Of the total number vaccinated (172) 40 were successful, a percentage of 23. Primary vaccinations were invariably successful.

Marine barracks.—There has been little improvement in the sanitary condition of the marine barracks during the year. The same defects exist which have been pointed out in previous reports. The ventilation of the sleeping quarters is not satisfactory, being only that afforded by the natural means of open doors and windows, practicable in mild weather, but impossible during the winter months, when cold drafts are created, subjecting the inmates to conditions prejudicial to health.

It is proposed to add another story to the barracks; and while this will give more cubic feet of breathing space it will not entirely remedy the difficulty, although lessening it. The double bunk, as at present in use, is condemned as being undesirable for various reasons, particularly as the ceilings are so low. The location and character of the water-closets used by the guard call for immediate improvement. They are imperfectly ventilated and lighted, and the only escape for vitiated air is by the mess room and courtyard. It is suggested that openings into the wash room be closed and a shaft introduced into the water-closet from the ceiling to several feet above the roof of the building, and that a double-door arrangement be made; additional openings to furnish light will also be necessary. These proposed changes have been referred to the colonel commandant of the Marine Corps for his consideration and action.

The floor of the court should be covered with concrete instead of brick, as at present, for the latter is always damp from retained moisture, and is prejudicial to health. The electric light should also be introduced into the barracks.

Prison.—The remarks as to the defects in the ventilation of the quarters of the marine guard apply with equal force to that of the prison; it is adequate in mild weather, but not during low temperatures, as open doors and windows are objectionable. Methods should be devised for admitting fresh air without subjecting the inmates to dangerous drafts. It will not be difficult to improve this condition of affairs, but to make it nearly perfect will require change and proportional expense. The gratings of the lower cells should be extended to the floor, thus admitting more air and light. These cells are 8 feet deep and are dark and ill ventilated. It is recommended that the inner row of cells be used for very short time prisoners.

Dispensary.—The building in which the dispensary is located remains in the same condition as for many years past, in spite of its unfitness in character and site. A special report relating to this subject was referred to the head of the department of yards and docks for review and estimate and is now under consideration by the commanding officer, before submitting it to the Bureau of Yards and Docks.

The present ineffective system of drainage and sewerage will, it is hoped, soon be replaced by modern scientific methods, as the connecting of the yard with the system of the Metropolitan Sewer Company of Massachusetts is pending.

Navy-yard, New York.—The sanitary condition of the yard itself, and of the houses situated in it, has been satisfactory. One case of typhoid fever was treated at the officers' quarters, marine barracks, and the disease was in all probability contracted outside of the yard. The fever was of a mild type and seemed benefited by the use of the chlorine treatment.

Owing to the removal of the steam-heating apparatus and the coal to an adjoining building, the office of the medical inspector, the dispensary, and the storerooms are in a better condition than heretofore. The supply of heat to these premises is insufficient without the use of stoves.

The following is a list of the accidents and injuries which occurred among the employees of the yard during the past year: Wounds, 54; contusions, 18; fractures, 2; minor troubles (vertigo, colic, etc.), 12; total, 86.

Navy-yard, League Island, Pa.—Attention is called to the necessity of furnishing the yard with a supply of pure water, improving the drainage, and of introducing the electric light.

The marine barracks are situated at the entrance gate to the navy-yard, and are adjacent to the low, marshy land lying between the yard and the city of Philadelphia. Notwithstanding this undesirable location, the health of the post has been remarkably good.

If the erection of new buildings for the marines is contemplated, it would be desirable to have them located on the Delaware River front, and on the western end of the island.

Navy-yard, Washington, D. C.—The sanitary condition of the yard during the past year has not been satisfactory. During the summer and autumn months malarial fever of a severe type prevailed extensively, a large proportion of the cases being of a remittent character. During the year there were 250 admissions and 48 readmissions to the sick list. Of this number, 216 returned to duty and 79 were transferred to hospital.

There was a loss of one thousand and twenty-one days from sickness, due principally to the large number of cases of malarial fever.

Reports have been received that apprentices transferred from this yard to other stations all suffered from attacks of malarial fever, undoubtedly due to climatic exposure while undergoing instruction at the yard.

Navy-yard, Norfolk, Va.—During the past year the health record of this yard has been better than in the preceding two years. On January 1, 1895, there remained on the sick list 2 patients; admitted and readmitted during the year, 114; discharged to duty, 74; to hospital, 39; died, 1; remaining on the list December 31, 1895, 2. There were 88 candidates examined for enlistment in the Marine Corps, and, of these, 55 were accepted.

The defect in the arrangement of the sewers at the marine barracks, to which attention was called in a previous report, has been remedied in accordance with the plans suggested by the board appointed to consider the matter.

From examinations frequently made of the water at this yard, obtained from driven wells, it has been found entirely unsuited for drinking purposes, owing to the excess of chloride of sodium contained in it.

Navy-yard, Pensacola, Fla.—The sanitary condition of the yard for the past year has been good, and the health of the officers and men has been excellent.

The artesian wells sunk by the Bureau of Yards and Docks have entirely failed to furnish the yard with a supply of potable water, and all wells have been abandoned for this object and are now only used for fire purposes.

The number of deaths on the reservation during the past year from all causes was 27. The entire absence of typhoid fever, and the marked decrease of the number of cases of malarial fever, in contrast with that of previous years, is undoubtedly due to the substitution of cistern water for surface well water for drinking and cooking purposes.

A better system of drainage is advocated for the reservation.

Navy-yard, Mare Island, Cal.—The health of the yard has been generally good, with the exception of a few cases of malarial fever and a number of cases of diarrhea, which prevailed in the last two quarters of 1895.

A new building, to be used exclusively by the medical department of the yard, and to be fitted up with a medical storehouse, dispensary, and surgeon's office, is imperatively needed. The space at present allotted to the medical department is a part of the equipment building, partitioned off from the rigging loft and entirely unsuitable for the above purposes, being badly ventilated and lighted, and not sufficiently roomy for the proper preservation of Government property. A better system of sewerage is also required.

NAVAL STATIONS.

Naval training station, Newport, R. I.—The sanitary conditions of this station have been satisfactory, the only epidemic disease having been la grippe and measles, the former prevailing in a mild form, though complicated with pneumonia in several cases. There were but 14 cases of measles, and the disease was quickly stamped out. The supply of water furnished has been far from satisfactory, but this difficulty will be obviated by the introduction of a wholesome supply from the Newport Water Company.

Naval station, New London, Conn.—The station has been comparatively free from disease, although, owing to the number of salt and fresh marshes adjacent to the reservation, cases of malarial fever, more or less severe in type, have prevailed during the past year.

Attention to sanitary measures by the introduction of a system of sewerage would tend largely toward improving the health of the station.

Naval station, Annapolis, Md.—The good health of the station has been maintained throughout the past year. There were 19 admissions, involving sixty-one sick days, for injuries received at the game of foot ball, and 90 excuses from drills from the same cause. The injuries consisted of 1 luxation, 2 fractures, 1 inguinal hernia, 2 cases of concussion of the brain, and a number of minor sprains and contusions.

The water supplied the Naval Academy has been more satisfactory in quantity and quality than formerly, and after filtration is as palatable as could be desired.

Attention is called to the unsuitable character of the Academy buildings, many of them being badly ventilated, unsatisfactorily lighted and heated, and some of them in a condition almost beyond repair.

The sewerage system of the Academy is defective and unsatisfactory and proper means should be adopted for carrying the sewerage into deep water at some distance from the Academy grounds.

During the past year the sick quarters have been partially renovated.

A modern operating room, with aseptic furniture and a bacteriological and chemical laboratory, will be introduced at an early date.

Marine headquarters, Washington, D. C.—The health of the post has been satisfactory during the past year, except that in the months of September, October, and November an unusually large number of cases of malarial fever prevailed, which undoubtedly was caused by the unsanitary condition existing at the navy-yard, which was made the subject of a report by a sanitary board to the Department in May, 1895.

Beyond some minor improvements in the introduction of modern water-closets and bath tubs, there has been no change in the general sanitary condition of the post.

Naval station, Port Royal, S. C.—The health of the station has been remarkably good. There have been but few cases of malarial fever, and in no case was the disease attributable to conditions existing at the station. Although the supply of drinking water has been increased by the construction of an additional cistern, yet the amount is not sufficient for the needs of the station. A condensing apparatus is recommended.

A small pavilion hospital is urgently needed for the requirements of the station, where, owing to the equable climate, all cases of incipient pulmonary disease may be treated with a fair prospect of recovery.

Naval station, Puget Sound, Port Orchard, Wash.—The health of the officers and workmen attached to this station has been good during the past year. Several cases of typhoid fever occurred in the vicinity of the station in the summer, indicating defective drainage and an impure water supply. No danger need be apprehended for the station, however, from this source, as an artesian well is now being bored that will furnish an abundant supply of pure water.

The houses now being built for the officers at the station are situated on elevated ground overlooking the bay, and from their position will afford every facility for good drainage.

The soil is nearly all sand, and this, with the elevation of the houses, insures against dampness; arrangements for heating them are good, and they will be lighted by electricity.

RECEIVING SHIPS.

U. S. receiving ship Wabash.—The sanitary condition has been good, and the ship made more comfortable by the introduction of the electric light. The average complement for the year was 165. Record of enlistments for the year shows: Number examined, 334; accepted, 231; rejected, 103.

U. S. receiving ship Vermont.—The records show a satisfactory sanitary condition of the ship. The food issued is of good quality and sufficient in quantity. Berthing space is abundant, and the bathing facilities ample.

During the past year 358 new cases were under treatment; of these, 277 were discharged to duty, 72 sent to hospital, 4 discharged from the service, and 1 given sick leave. There were 4 deaths. There were 5 cases of measles, all of them mild in type, and the disease did not assume an epidemic form. During the year there were 2,876 physical examinations for enlistment; of these, 1,767 were accepted, 31 rejected for color blindness, and 1,078 for other causes.

U. S. receiving ship Richmond.—During the past year 505 recruits have been examined; accepted, 334; rejected, 170. Apprentices examined, 302; accepted, 155; rejected, 147. Total number of examinations for enlistment during the past year, 807. The health of the ship has been good. During cold weather, from October to May, the ship is heated by steam, and condensed water is used for drinking and cooking purposes. During the summer months water for these purposes is supplied by water boat and collected above the entrance into the Delaware River of the city's sewage.

The medical department of this ship now occupies spacious, well-lighted quarters, situated on the port side of the quarter deck, and consisting of an examining room 24 feet in length, 7 feet in width, and 6 feet between decks, and a dispensary, large, well ventilated, and properly fitted up.

U. S. receiving ship Franklin.—The records show that during the past year 385 men were examined for enlistment; accepted, 258; rejected, 127. One hundred and eighty-three of the applicants were examined for first enlistment; of this number 83 were accepted and 100 rejected.

The sanitary condition of the ship has been excellent, and there were no cases of special interest under treatment. Total number treated, 63; discharged to duty, 45; transferred to hospital, 15; died, 1, and remaining under treatment, 2.

U. S. receiving ship Independence.—Records of enlistment for the past year show that 1,138 were examined; accepted, 725; rejected, 413.

As a large proportion of the enlistments for our ships cruising on the Asiatic and Pacific stations are made on this ship, adequate measures should be taken toward fitting up a large well-lighted and ventilated room for properly carrying on this duty.

RECRUITING.

The following table shows the record of enlistments and rejections for the year 1895:

Where examined.	Number examined.	Number accepted.	Number rejected.	Number color-blind.
U. S. R. S. Wabash, Boston, Mass	334	231	103	17
U. S. R. S. Vermont, New York, N. Y	2,876	1,767	1,109	31
U. S. R. S. Minnesota, New York, N. Y	793	288	505	68
U. S. R. S. Richmond, Philadelphia, Pa	807	486	321	27
U. S. R. S. Franklin, Norfolk, Va	385	258	127	10
U. S. R. S. Independence, Mare Island, Cal	1,138	725	413	35
Marine rendezvous, Boston, Mass	233	198	35	....
Marine rendezvous, Philadelphia, Pa	326	180	146	5
Marine rendezvous, San Francisco, Cal	657	298	359	46
On cruising vessels and at shore stations other than marine rendezvous and receiving ships	2,438	1,815	623	30
Total	9,987	6,246	3,741	269
RECAPITULATION.				
All receiving ships	6,333	3,755	2,578	188
All marine rendezvous	1,216	676	540	51
Shore stations and cruising vessels	2,438	1,815	623	30

Number rejected per 1,000, 374 +. Color-blind per 1,000, 26 +.

NAVY PENSIONS.

The following statement shows the amount and character of the work carried on under the pension division of this office during the fiscal year ended June 30, 1896, including calls from the Pension Office, examination of records of officers for promotion and retirement, reports of medical survey, certificates of death, and miscellaneous reports and papers.

All pension cases have been answered promptly and satisfactorily, and at the close of the fiscal year there were no calls from the Pension Office remaining unanswered in this Bureau.

It is also gratifying to state that the miscellaneous work embraced in this division of the office has been brought up to date.

Number of pension cases remaining on hand June 30, 1895	238
Number received during fiscal year ending June 30, 1896	3,288
Number answered during fiscal year ending June 30, 1896	3,526
Number remaining on hand June 30, 1896	0

The miscellaneous reports associated with the pension work during the fiscal year ending June 30, 1896, are shown by the following record:

Number of cases for board of medical examiners received and answered	112
Number of cases for retiring board received and answered	43
Number of cases from Judge-Advocate-General of the Navy received and answered	11
Number of cases from Civil Service Commission received and answered	25
Number of Congressional, Auditor for the Navy Department, and miscellaneous letters received and answered	104
Number of certificates of death received	107
Number of reports of medical survey received and acted upon	477
Number of reports of physical disqualification received and acted upon	211

UNITED STATES NAVAL MUSEUM OF HYGIENE.

The fourteenth annual report of this establishment gives in detail the progress of work during the last fiscal year.

The buildings have been painted on the outside, stone and brick piers have been removed from the basement, and new floors have been laid in library and buildings. Unused cisterns have been filled in and a new heating plant is being introduced.

The museum exhibit is being carefully arranged and new exhibits put in place. The library has been completely refitted and books have been classified and arranged ready for use. Many valuable additions in the way of State and municipal health and water reports, Government publications, and private contributions have been received, and an unusual amount of important work has been done by the officers of the museum.

The hygienic care of ships and the prevention of epidemic diseases have been subjects of a careful report. Careful reports have been prepared on materials and supplies, new inventions, etc., and in the laboratory many chemical and bacteriological examinations of water, urine, blood, milk, etc., have been made. One hundred and ninety-two large and valuable photographs were prepared for the office of the Secretary of the Navy. The variety of work performed increases each year as the growth and progress of the museum continue. As a central national museum of sanitary science, it should be second to none in the world.

UNITED STATES NAVAL LABORATORY AND DEPARTMENT OF INSTRUCTION.

The course of instruction established by Department circular dated June 22, 1893, at the United States Naval Laboratory and Department of Instruction for junior medical officers of the Navy, preliminary to entering upon active service, has been attended with the most satisfactory results.

Besides affording the young officers a practical insight into their professional studies, it gives them an opportunity of becoming conversant with the usages and customs of the service and familiarizing themselves with the duties of medical officers, afloat and on shore, without which preparatory instruction they would be confronted with serious difficulties and placed at a disadvantage in the performance of their duties.

Seventeen assistant surgeons have attended the course of instruction since its establishment, and an examination of their papers, submitted by the corps of instructors through the director of the laboratory, gives evidence of conscientious work.

Several medical officers recently promoted to the grade of passed assistant surgeon have availed themselves of the special facilities afforded in many of the branches of the prescribed course.

SUPPLY TABLE, MICROSCOPES, ETC.

The supply table of the Medical Department of the Navy has been improved by the addition of bacteriological and chemical supplies for laboratories, and an outfit of aseptic furniture for operating rooms at all naval hospitals.

A standard outfit of microscopes and accessories has been perfected: (1) For hospitals; (2) for ships and navy-yards.

The cases have been specially prepared under the direction of the Bureau, careful attention being given to accessibility of contents and compactness. These instruments will be furnished at an early date. For special microscopical work, medical officers of the several stations are permitted, upon application to the officer in charge, to visit the naval hospitals and use the more elaborate outfits supplied those institutions.

A splint, constructed to give steady, continuous extension in fractures of the femur, has been favorably reported upon, and will be furnished the Medical Department as required. A wood-pulp splint for general use has also been selected.

BACTERIOLOGICAL AND CHEMICAL LABORATORIES AT HOSPITALS.

Complete outfits of bacteriological and chemical supplies, systematically and conveniently arranged, have been selected for small laboratories at all naval hospitals for diagnostic purposes and investigations of questions in pathology and hygiene. This subject is considered by the Bureau to be one of no small importance, and as the laboratories will soon be in working order it is believed that hospital work will be carried on in future with additional precision and accuracy.

ASEPTIC OPERATING ROOMS AND FURNITURE.

All naval hospitals have been specially equipped with aseptic operating rooms and furniture to meet the demands rendered imperatively necessary by the steady advancement in surgical treatment.

The ceilings and walls, to within 6 feet of the floor of rooms set apart for the purpose at hospitals at Portsmouth, Chelsea, Philadelphia, Washington, and Yokohama, were painted with two coats of lead paint. The walls, to a height of 6 feet from the floor, were painted with three coats of porcelain-enamel paint, and all the metal and woodwork covered with two coats of xylo-enamel paint. All cracks in the floor were filled with putty, and on this was placed one coat of a buff-colored stain, this covered with one coat of shellac and finally with two coats of floor-enamel paint. As these enamel paints form a hard, smooth surface, which can be readily cleaned with antiseptic solutions, they were used on the floors and walls instead of tiling on account of decreased cost.

A sufficient number of electric lights, with movable burners that can be used when required to reflect light into cavities, or in using laryngoscope or endoscope, have been introduced and properly located to insure artificial light during operations. For cleansing instruments, etc., these rooms have been fitted with porcelain sinks, accessible on all sides, with movable brackets, hot and cold water faucets, and waste pipes trapped with "bottle" trap; oval wash basins, with marble slabs, furnished with hot and cold water faucets, "Belmer" waste and "Puro" trap, and a sufficient number of glass shelves at convenient points supported by white enameled-iron brackets, and glass rods for holding towels.

The aseptic furniture supplied includes nickel-plated water sterilizers, with two tanks, capacity 15 gallons each, to supply absolutely sterile water, "Standard" horizontal dressing sterilizers, instrument sterilizers, Bolts's operating tables, glass irrigators on white enameled iron pedestals, wheeled stretchers of white enameled iron on rubber rollers, and every other article necessary to complete an aseptic outfit to meet every emergency. The operating rooms at the naval hospitals of Norfolk and New York differ from the others only in having separate and connecting etherizing, recovering, sterilizing, and receiving rooms. They are new in design, and prepared with interior fittings of cement, tiles, etc.

DISINFECTING PLANT ADOPTED FOR NAVAL HOSPITALS.

Disinfecting plants of modern make will be installed at all hospitals in connection with the laundry.

The oven adopted will rest in circular openings in the laundry wall, and be so fitted as to totally exclude communication. The disinfectors will include metallic retaining straps for mattresses, and two galvanized-wire cages for holding clothing and other articles undergoing disinfection. The room in connection with the laundry to receive disinfecting chambers will be made of smooth brick, resting upon suitable foundations, covering a ground space of sufficient size, and constructed so as to completely cut off and isolate the two apartments. These are to be finished throughout with Portland cement, so that they can be easily washed by water or antiseptic solutions. The disinfector when fixed in the wall completely isolates the door of entrance to the chamber for contaminated articles from the door of exit after disinfection—the manipulation of valves to take place from the purified end.

BOOK OF INSTRUCTIONS.

The revision of the Book of Instructions for Medical Officers so as to meet the requirements of the service is receiving careful attention, and contemplates a uniform system of regulations for the administration of all hospitals, and instructions relating to the care and preservation of roads, trees, buildings, grounds, and cemeteries. Specific instructions will also be issued relating to recruiting, inventories, requisitions, surveys, and sanitary reports, and methods to be observed in properly caring for microscopes and surgical instruments.

FIRST ANNUAL STATISTICAL REPORT UNDER SYSTEM ADOPTED JANUARY 1, 1895.

The present statistical report is based upon a plan that went into effect on January 1, 1895. It is thus the first compilation under the new system. The results are very satisfactory, and an accurate report of the occurrence and effect of disease and injury in the naval service is now presented. The new nomenclature is well adapted to the requirements of the Navy, and is the product of a careful consideration of modern pathology, the terms employed being regarded as the most comprehensive allowed by the present system of medical education. The classification of diseases is chiefly anatomical, but in the formation of certain important classes causation has been allowed to control.

In addition to greater accuracy in the designation and grouping of diseases, the system includes a method of preventing the appearance among the admissions of the same case more than once, every admission for the continuance of the same disease being regarded as a readmission, the original admission only being counted. It therefore results that under this system the number of admissions for any one disease during a year is the actual number of cases of that disease occurring during that year or of individuals who suffered from it.

In the special instructions issued to medical officers it is enjoined that no symptom shall be considered as the diagnosis of any case when it is practicable to classify it under the disease which is its cause, and that in making a diagnosis preference shall be given to the primary disease, except where the secondary disease is the main or only cause of admission or overshadows the primary disease. While medical officers are not limited to the nomenclature, a place under each class being provided for other diseases of that class, they are cautioned to avoid terms synonymous with those appearing in the table. The number of diseases specified has been greatly increased and every facility given for the expression of an accurate diagnosis in each case.

New tables have been added and important additional information secured.

In view of the above it is apparent that the statistics commencing with the year 1895 can not properly be compared with those of any preceding year. However, on the present basis valuable data are obtained which will annually increase in value and admit of definite comparisons in future years.

VACANCIES IN THE MEDICAL CORPS OF THE NAVY.

The record during the last fiscal year is nearly a repetition of the figures presented in the last annual report. There were 341 applications made to the Department concerning the appointment of assistant surgeons in the Navy. Replies containing instructions were promptly forwarded in every instance. Out of the number only 36 applied for permission to appear before the naval medical examining boards, as follows:

California	2	North Carolina	4
Connecticut	1	New Jersey	2
District of Columbia	1	New York	4
Georgia	1	Ohio	1
Indiana	2	Pennsylvania	6
Iowa	1	Texas	1
Illinois	1	Vermont	1
Kansas	2	Virginia	2
Kentucky	1	West Virginia	1
Massachusetts	1		
Maryland	1	Total	36

Of the 36 mentioned who received permission, 22 availed themselves of the opportunity to appear before the boards, and of this number there were 4 rejected physically and 12 rejected professionally, leaving only 6 out of the 341 original applicants, representing every section of the country, who were found qualified for appointment as assistant surgeon, viz:

Connecticut	1	Ohio	1
Georgia	1	Virginia	1
North Carolina	1		—
New York	1	Total	6

This state of affairs has existed for years, and will undoubtedly continue until there is some favorable legislation for junior medical officers of the Navy.

At this date there are 10 vacancies in the grade of assistant surgeon, and the Bureau is embarrassed by not having a sufficient number of medical officers to fill important stations ashore and afloat.

Many ships and hospitals are kept without their legitimate quota of officers, and, unless this is in some way speedily remedied, by reason of the increase of men in the Navy and the number of new ships placed in commission annually serious consequences must follow. On account of the great number of vacancies existing and the probability of the number increasing instead of diminishing, it is strongly urged that the recommendation contained in the Bureau's letter addressed to the Department on the subject, dated February 8, 1896, be approved, that "a special law be enacted authorizing the Secretary of the Navy, during the present exigency, to appoint acting assistant surgeons for temporary duty in the Navy until the number of vacancies in the regular medical corps of the Navy are filled." When this is accomplished, their services can be dispensed with and no further appointments made, except in time of war or until additional vacancies occur in the assistant surgeon's grade.

PASSED ASSISTANT SURGEONS.

A bill providing for the professional and physical examinations of passed assistant surgeons, preliminary to promotion to the grade of surgeon, to which attention was called in the Bureau's last annual report, was introduced into both Houses of Congress and favorably reported and passed by the Senate March 2, 1896. The bill has also been favorably considered by the House Naval Committee, and action is expected the early part of next session.

The enactment into law of this proposed bill will contribute materially, both professionally and physically, toward improving the personnel of the corps.

AMERICAN PUBLIC HEALTH ASSOCIATION, AMERICAN MEDICAL ASSOCIATION, ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES, AND PAN-AMERICAN MEDICAL CONGRESS.

The American Public Health Association held its twenth-third annual meeting at Denver, Colo., October 1 to 4, 1895, and the Medical Department of the Navy was represented by Medical Director N. L. Bates, in charge of the United States Naval Museum of Hygiene. Owing to various causes the attendance upon the meeting was limited, but this was more than compensated for by the standing and prominence of the delegates present and the character and scope of the papers presented and discussed.

An account of the proceedings will be found among the special reports. The next meeting of the association will be held at Buffalo, September 15 to 18, 1896.

The American Medical Association held its forty-seventh annual meeting on the 5th, 6th, and 7th of May last at Atlanta, Ga., and the Medical Department of the Navy was represented by Surg. J. Shirley Hope, whose detailed description of the proceedings of the association will be found among the papers appended to this report.

Medical Inspector John C. Wise and P. A. Surg. T. C. Craig were detailed to represent the Medical Department of the Navy at the sixth annual meeting of the Association of Military Surgeons of the United States, which convened at Philadelphia, Pa., May 12 to 14, 1896.

Papers were read by these officers, entitled, respectively, "Cooperation in public sanitation" and "The viability of the cholera spirillum in its relation to certain fruit acids." The latter paper is embraced in the special reports.

The proceedings were of unusual interest, many important papers of professional and scientific value being presented and discussed by medical officers of the Army, Navy, and National Guard.

The Mexican Government, through its minister at this capital, extended in February last an invitation to this Government for representatives from the Medical Department of the Navy to be present at the second Pan-American Medical Congress, which will meet in the City of Mexico on the 16th, 17th, 18th, and 19th of November, 1896.

Medical Director George W. Woods was detailed for this duty, and his paper presented to the Congress, entitled "Intestinal Obstruction," will be submitted in a subsequent report.

INVESTIGATION OF PLAGUE IN CHINA AND CHOLERA IN JAPAN.

Upon the request of the Surgeon-General of the Navy, and by direction of the Department, P. A. Surg. W. F. Arnold was detached from the U. S. S. *Petrel*, Asiatic station, and ordered, September 16, 1895, on special duty in connection with the investigation of the outbreak of plague in China and of cholera in Japan, and United States representatives in those countries requested to obtain the necessary authority to enable him to carry on the work desired.

Satisfactory preliminary reports have been received relating to the duty assigned him, and it is believed that the results of his investigation of the subject mentioned will show careful study and reveal additional facts regarding cholera and a knowledge of the recent plague in China so much desired by the health authorities of this country. A synopsis of his general report is appended.

Dr. Arnold's duty extended over a period of ten months, and being completed, he was detached and ordered home July 1, 1896.

SICK QUARTERS ON UNITED STATES NAVAL VESSELS.

Attention was called in the Bureau's last annual report to the necessity of providing improved accommodations for the sick and wounded on board vessels of war, and to the assignment, when practicable, of sufficient space on the gun deck for hospital purposes. It is believed that good results could be accomplished in this direction if the board of inspection and survey were officially directed to pay special attention to the subject, and the medical officer attached to the board required to visit all ships and submit special reports upon their facilities for the care and treatment of the sick and wounded; defining changes to be made when found necessary and feasible; reporting upon such facts as can be readily obtained relating to officers' quarters, gun and berth decks, number of occupants, and total air space allowed; location and ventilation of holds and bilges, and such other information as would be of value to the Department in determining the character of alterations to be made when the vessel becomes available and before being recommissioned.

NAVAL HOSPITAL CORPS.

The Naval Hospital Corps bill submitted to the Department February 3, 1896, and alluded to in last annual report, embraces, it is believed, all the essential features requisite for an efficient hospital corps, consisting of hospital apprentices, hospital apprentices second class, hospital apprentices first class, and pharmacists, who, it is provided, shall perform all necessary hospital and ambulance service at naval hospitals, naval stations, navy-yards, and marine barracks, and on vessels of the Navy, Coast Survey, and Fish Commission, the corps to be permanently attached to the Medical Department of the Navy, and not included in the effective strength of the Navy, nor counted as a part of the enlisted force heretofore provided by law, but shall be subject to the laws and regulations of the Navy.

All apothecaries serving in the United States Navy shall be known and designated as pharmacists in the Naval Hospital Corps, and shall be placed upon the list of warrant officers with rank, pay, and privileges of the same, and their names shall be entered in the order of their admission to the service, and nothing shall deprive an enlisted or appointed apothecary in the Navy of a warrant as pharmacist in the Naval Hospital Corps, and they shall retain their position in the Hospital Corps of the Navy, and shall be eligible for duty both ashore and afloat.

There shall be as many pharmacists warranted in the Naval Hospital Corps as in the judgment of the Secretary of the Navy the service may require, and not more than one pharmacist shall be stationed at any hospital, laboratory, station, or ship, without special authority of the Secretary of the Navy.

No person shall be warranted as pharmacist in the Naval Hospital Corps, except as above provided, unless he be a graduate in pharmacy or has served by continuous enlistment as hospital apprentice and hospital apprentice second class, and shall have passed a satisfactory examination before a board of two or more medical officers of the Navy as to his qualifications for the position, and no person shall be eligible for such examination except by written authority of the Secretary of the Navy.

All pharmacists in the Naval Hospital Corps who shall have served the time required by law, shall, upon their written request, be placed upon the retired list of the Navy, as provided for other warrant officers; and those who shall have reached the age of 62 shall be placed on the retired list of the Navy with the pay of a warrant officer, retired, of the highest class.

Hospital apprentices of the first class of the Naval Hospital Corps may be detailed as acting pharmacists by the Secretary of the Navy, upon the recommendation of the Surgeon-General, whenever the necessities of the service may require it, and while so detailed they shall receive the benefits of the laws relating to pharmacists warranted in the Naval Hospital Corps. On board of vessels away from the United States this detail may be made by the commander of the squadron, or in the case of a vessel acting singly, by the commanding officer, upon the recommendation of the senior medical officer of the vessel. The permanency of such detail to be subject to the approval of the Surgeon-General and Secretary of the Navy.

The Secretary of the Navy is empowered to enlist or cause to be enlisted as many men in the Hospital Corps as the service may require, and to limit or fix the number; and any enlisted man in the Navy shall be eligible for transfer to the Hospital Corps as hospital apprentice.

Upon enlistment or transfer, as hospital apprentice in Hospital Corps, they shall be admitted for instructions to the training schools for nurses, to be established by the Secretary of the Navy at the United States naval hospitals located at Mare Island, Cal., Chelsea, Mass., Brooklyn, N. Y., Philadelphia, Pa., Washington, D. C., and Norfolk, Va. This instruction shall be continuous at training schools, stations, and on vessels, from first enlistment until qualified as pharmacist. While undergoing instruction they shall perform duty as ward masters, cooks, nurses, and attendants in hospital and as stretcher bearers, litter bearers, ambulance attendants, and such other duties as may by proper authority be required of them. If found unfitted by any cause to receive instructions or to perform intelligently the responsible duty of attending to sick and wounded men, the fact shall be reported to the Secretary of the Navy, who may authorize their discharge from the service.

The pay of hospital apprentice of the Hospital Corps, first enlistment, shall be $18 per month; that of hospital apprentice, second class, if continuous enlistment, $22 per month; that of hospital apprentice, first class, if continuous from first enlistment, $25 per month.

All benefits derived under existing laws, or that may hereafter be allowed by law to other enlisted men in the Navy, shall be applied in the same manner to the enlisted men in the Hospital Corps of the Navy. Enlistments for duty in the Hospital Corps of the Navy shall be for the term of four years.

In estimating continuous service for pharmacists who have been appointed from the enlisted force of the Naval Hospital Corps, they shall be credited with the service performed as hospital apprentice, hospital apprentice, second class, and hospital apprentice, first class.

The Secretary of the Navy shall make such rules and regulations for the government of pharmacists and enlisted men of the Naval Hospital Corps as may be necessary.

Recruiting for service in the Naval Hospital Corps shall be at such hospitals as are provided with training schools for nurses.

With a well-equipped and thoroughly organized hospital corps, as contemplated, every emergency arising either in war or peace can be promptly and intelligently met, and the important questions properly solved relating to the means and best methods of handling and caring for wounded in battle on board of modern ships of war. No definite results can ever be obtained without an organization. The Medical Department of our Army discovered the necessity of a hospital corps organization years ago, and it has kept pace with similar corps in foreign armies. Such corps exist in the medical departments of the navies of all important powers, and there should be no further delay in incorporating the system in our own service. Aside from the advantages that would be gained by the regular Navy, our obligations of assistance to the medical department of the Naval Militia could be wisely and fairly sustained.

The passage of the bill organizing the Army Hospital Corps has already proved of great benefit to the militia of the different States, and the passage of a similar bill for the Navy would also be advantageous to the Naval Militia, now being rapidly organized. Since the law providing for the wants of the Army, ambulance and hospital corps have been organized and maintained in the militia in over twenty-one States, representing all sections of the country. That such organizations are considered of vital importance by medical men who hold responsible positions in the militia can be shown by the fact that the surgeon-general of Arizona "has organized a hospital corps, to which he gives weekly instruction, and which he is rapidly making very efficient. In the absence of any Territorial appropriation therefor, this officer has provided his corps, at his own expense, with litter, pouches, emergency case, field case, hospital corps knives, and badges."

Although the Naval Militia is organized in New York, Massachusetts, Rhode Island, Louisiana, Maryland, Connecticut, New Jersey, Pennsylvania, Michigan, Illinois, North Carolina, South Carolina, and California, no attention has yet been paid to the subject of hospital corps, and probably no organization will be attempted until a hospital corps is established in the Navy, when it can be followed to meet the wants of the Naval Militia in the same manner as the Hospital Corps of the Army is being adopted by the militia of different States. At the present day no naval hospital should be without its corps of well-trained nurses, and no ship should be allowed to go to sea without the requisite number of trained nurses on board. The present system of limiting and picking up nurses for service at naval hospitals and on board ship antedates war times, is detrimental to both patient and medical officer, is obsolete, and should be discontinued as soon as possible. All civil hospitals years ago found the necessity of educating and training their own nurses, established their training schools, and to-day there is not a responsible public institution of the kind in any city of the land but is supplied with a trained corps of assistants.

The same system can be applied in the Medical Department of the Navy by the organization of a Naval Hospital Corps, which has been strongly advocated in previous reports, and is becoming more and more necessary to meet the increasing wants and growth of the Navy.

HANDLING SICK AND WOUNDED—AMBULANCE SHIPS.

Interest continues in the study of this important subject, and the views advanced in the last annual report are still entertained, believing that in the event of battle some efficient and practical provision must be made to care for the wounded, wholly different from what now exists in the Navy. Aside from the many ways at present employed on board different ships by reason of difference in construction, an asylum for their immediate reception should be at hand in every fleet in the event of an engagement. Ambulance or hospital ships specially fitted can only answer this purpose, and until they are allowed the naval medical service will be incomplete. Considerable attention is now being paid to the construction of such vessels abroad, and it is universally conceded that they should be designed and built for this particular duty, and considered an essential part of the fleet of war.

It is interesting to notice, from reports received, the complete organization for field service that exists in the medical department of the British army.

1. The regimental surgeons with the regimental stretcher-bearers.
2. The bearer companies.
3. The field hospitals.

4. The stationary hospitals on the line of communication, the base hospital, and the hospital ship or ships.

By this means continuous medical assistance is afforded the British soldier from the moment he falls in action until his restoration to health at a temporary hospital or discharge from service on account of disability from permanent Government hospital at home, where he has been transferred by ambulance ship. If this is considered essential in an army organization, how much greater appears the necessity in a navy organization.

These relief ships are fast steamers, fitted with comfortable beds, and are equipped and conducted by the officers of the medical staff and men of the hospital corps, who have been thoroughly trained in time of peace in the duties of nursing and caring for the wounded.

On board fighting vessels, in case of war, there can not be sufficient room with proper security to attend to the sick and wounded, nor would there be a sufficient complement of surgeons and nurses to supply the fleet, so the best professional assistance at hand might prove a failure in action.

This whole question of rendering proper assistance in naval warfare is of such interest that public attention abroad has been called to the necessity of establishing "a naval ambulance association for the treatment of sick and wounded at sea," corresponding with St. John's Ambulance Association, the aim being to "succor all during and after the battle without regard to nationality, and to proceed with their rafts to the assistance of the crew" in case of loss of a vessel.

It is stated that in the last naval battle between the Austrian and Italian fleets, now thirty years ago, "more than 400 men were drowned uselessly in the battle while they might have been saved" had an ambulance ship been in attendance.

The plans suggested for vessels provide large wards for officers and men on spar deck for treatment of serious cases, and additional wards, affording ample space, on main deck and lower deck. Natural ventilation is assisted "by a steam-spray extracting apparatus, as well as by a steam-fan blast that pumps in an abundant supply of fresh air."

In addition to the cot outlined in last report for handling and lowering wounded through the small hatches of modern men-of-war, a system devised by John Thompson, seaman, of the U. S. S. *Columbia*, has been used on board with most satisfactory results. The Wells ambulance cot is used, and, with the addition of some fathoms of small rope and snap hooks, the apparatus is easily completed. The seat portion has slats of wood parallel with the thighs to keep it flat, and no matter what portion of the body is wounded, the cot can be adjusted so as to lower the wounded man in a comfortable and easy position, with parts well secured. It is easily handled and readily adjusted. The drawings of this cot for lowering are on file, and a model will be sent to the Bureau on completion.

Reports have been received from abroad, accompanied with prints, relating to the transportation of wounded on board ship by means of the hammock, but on examination do not equal the method adopted by the Department in General Order No. 452.

During the year several persons rescued from the Old Dominion steamer *Wyanoke*, shortly after the collision on the 28th of April last at Newport News, Va., were treated on board the U. S. S. *Columbia*. The cases were of partial drowning, burns, scalds, contusions, shock, chill, and prostration. Owing to the immediate assistance rendered and readiness of supplies, success followed in every instance.

SWINGING COTS FOR SICK BAYS.

The new sick-bay cot, recently adopted by the Bureau for use on battle ships and other vessels when practicable, seems to answer every purpose. It is made of iron, with mattress of wire netting, and suspended so as to swing or not as the patient may desire or the nature of the case requires. The bed frame is 6 feet 2 inches by 2 feet 6 inches; head rail 16 inches high; foot rail 12 inches high, with perpendicular rods riveted in top and to a flat rail 3 inches from bed frame; head and foot rails arranged to fold down flat for transport; suitable stays provided for holding head and foot rails rigid when in use. Four folding legs 6 inches long are provided in order that cot may stand on floor when unshipped from its supports. Two bars are riveted, one at head, other at foot, terminating in a swing shackle by which the cot is hung, and by means of which the rolling motion is to a great extent obviated. The lower end of above is furnished with a hinged clutch, by which the cot can be fixed rigidly on its supports. Two stanchions are provided, each with a double hook, by which the cot is hung; a double hook is provided, so that if necessary the cots may be hung in a continuous line, with only one stanchion to support the head of one cot and the foot of the next cot. Cast-iron sockets are provided for letting into the deck. The lower end of stanchion fits into this socket and is tightened with a suitable wedge key. A wooden table is provided with double-nutted iron supports for fixing same to head rail and also canvas sides with eyelet holes in ends and lacings for lashing to head and foot rails, and suitable cross bar, with line for patients to raise themselves.

AMBULANCE SERVICE AND AMBULANCES.

Orders for the two ambulances allowed under appropriation approved June 10, 1896, for use at the naval hospitals at Philadelphia, Pa., and Washington, D. C., have been placed with the Abbot-Downing Company, of Concord, N. H., at a total cost of $1,180 and will be manufactured in accordance with specifications and plans adopted for the ambulances previously supplied by the firm mentioned.

The ambulances are all of modern construction, superior even to those employed at civil hospitals, and most satisfactory, and are considered a great improvement over former methods of transportation of sick and wounded. They are fitted with every necessary appliance to convey patients safely and comfortably, and are used only for this legitimate duty.

An ambulance case has been carefully prepared and accompanies the ambulance whenever it leaves the hospital, with the following outfit, complete and in order:

I. *Case of medicines* (*leather case*).

Aromatic spirits of ammonia	drachm	4
Brandy	do	4
Chloroform	do	4
Ether	do	4
Fluid extract of ergot	do	2
Hoffman's anodyne	do	4
Spirit of nitroglycerin	do	2
Squibb's mixture	do	2
Tincture of digitalis	do	2

II. *Case of instruments* (*linen rolling case*).

Forceps, hæmostatic	number	2
Pins, safety	do	4
Scalpel, with folding blade	do	1
Scissors	do	1

III. *Syringe, hypodermic (aluminum case, four tubes).*

Apomorphine hydrochlorate (gr., $\frac{1}{12}$)	tube	1
Atropine sulphate (gr. $\frac{1}{100}$)	do	1
Morphine sulphate (gr. $\frac{1}{4}$)	do	1
Strychnine sulphate (gr. $\frac{1}{30}$)	do	1

IV. *Tourniquets (in linen bag).*

Esmarch	number	1
Instant	do	1

V. *Miscellaneous.*

Bandages, muslin	number	6
Cotton, borated	ounces	2
Gauze, sublimated, in tin	yard	1
Teaspoon	number	1
Whisky, in flask, with cup	ounces	4

GENERAL OUTFIT (TO BE KEPT IN AMBULANCE).

Blanket	number	1
Canteens (potable water)	do	2
Lantern, hand	do	1
Pillow (rubber cover)	do	1
Sheet, rubber	do	1
Splints, selected set	do	1

Hospital instructions are plainly given in writing before the ambulance leaves in obedience to a call, and result of call likewise recorded in accordance with specified form.

The ambulance record, kept on file at all hospitals, embraces date, time, and locality of call, time of leaving, arrival at destination, and return to hospital, with name of patient, where taken, person in charge, etc. All cases are entered, whether in naval service or not.

Two additional ambulances are still needed to make the service complete—one for the United States naval hospital, Mare Island, Cal., to replace one condemned as useless, and one for United States naval hospital, Portsmouth, N. H. An estimate of $1,200 is submitted in the annual estimates to supply said establishments.

Modern ambulance service has been commenced at the following naval hospitals: New York, Chelsea, Norfolk, Philadelphia, and Washington.

CONCLUSION.

In concluding my report I am pleased to state that all work coming under the cognizance of the Bureau has progressed satisfactorily, with the exception of that called for under contract "For improvements and repairs at naval hospital, New York."

The care and comfort of the sick and wounded of the Navy will be much improved by the introduction of iron swinging cots for sick bays of all vessels, and the establishment of an ambulance service at the naval hospitals at Chelsea, New York, Philadelphia, Washington and Norfolk.

Revision of diet tables at hospitals and of the present temperature charts will soon be made and a prescription book adopted for ship use, to accompany the medical journal.

On the 29th of September, 1896, the hospital recently constructed at the United States naval station, Newport, R. I., was transferred to the Bureau, and preliminary instructions have been given preparatory to fitting it up for the reception of patients.

The health of the Navy for the year 1895 is clearly shown by the new statistical tables herewith submitted.

Very respectfully,

J. R. TRYON,
Surgeon-General United States Navy.

The SECRETARY OF THE NAVY.

Estimates of appropriations required for the service of the fiscal year ending June 30, 1898, by the Bureau of Medicine and Surgery, Navy Department.

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1897.
SALARIES.			
Chief clerk (appropriated, act of May 28, 1896)	$1,800.00		
One clerk of class 3 (same act)	1,600.00		
One clerk of class 2 (same act)	1,400.00		
One clerk of class 1 (same act)	1,200.00		
One clerk (same act)	1,000.00		
One laborer (same act)	660.00		
One janitor for naval dispensary (same act)	600.00		
One laborer for naval dispensary (same act)	480.00	$8,740.00	$11,860.00
MEDICAL DEPARTMENT.			
For surgeons' necessaries for vessels in commission, navy-yards, naval stations, Marine Corps, and Coast Survey, and for the civil establishment at the several naval hospitals, navy-yards, naval laboratory and department of instruction, museum of hygiene, and Naval Academy (appropriated, act of June 10, 1896)	65,000.00	65,000.00	65,000.00
NAVAL HOSPITAL FUND.			
For maintenance of the naval hospitals at the various navy-yards and stations, and for care and maintenance of patients in other hospitals at home and abroad (appropriated, act of June 10, 1896)	20,000.00	20,000.00	20,000.00
CONTINGENT, BUREAU OF MEDICINE AND SURGERY.			
For freight, expressage on medical stores, tolls, ferriages, transportation of sick to hospital, transportation of insane patients; care, transportation, and burial of the dead; advertising; telegraphing; rent of telephones; purchase of books and stationery; binding of medical records, unbound books; and pamphlets; postage and purchase of stamps for foreign service; expenses attending the medical board of examiners; rent of rooms for naval dispensary; hygienic and sanitary investigation and illustration; sanitary and hygienic instruction; purchase and repairs of wagons and harness; purchase of and feed for horses and cows; trees, plants, garden tools, and seeds; furniture and incidental articles for the museum of hygiene, naval dispensary, Washington; naval laboratory, sick quarters at Naval Academy and marine barracks, surgeons' offices and dispensaries at navy-yards and naval stations; washing for medical department at museum of hygiene, naval dispensary, Washington; naval laboratory and department of instruction, sick quarters at Naval Academy and marine barracks, dispensaries at navy-yards and naval stations and ships and rendezvous, and for minor repairs on buildings and grounds of the United States Naval Museum of Hygiene, and all other necessary contingent expenses (appropriated, act of June 10, 1896)	30,000.00	30,000.00	30,000.00
REPAIRS, BUREAU OF MEDICINE AND SURGERY.			
For necessary repairs of naval laboratory and department of instruction, naval hospitals and appendages, including roads, wharves, outhouses, sidewalks, fences, gardens, farms, and cemeteries (appropriated, act of June 10, 1896)	20,000.00	20,000.00	20,000.00
AMBULANCES FOR NAVAL HOSPITALS.			
For supplying two naval hospitals with ambulances of modern construction, to replace vehicles condemned as useless (appropriated, act of June 10, 1896.)	1,200.00	1,200.00	1,200.00
NAVAL CEMETERY AT UNITED STATES NAVAL HOSPITAL, BROOKLYN, N. Y.			
Labor and material for widening of approaches, and repairing and painting all gates and fences; for making graveled roads and paths; building walls where necessary, properly grading the whole area and planting appropriate shrubbery (appropriated, act of June 10, 1896)	1,000.00	1,000.00	1,000.00

STATISTICAL REPORT

OF THE

HEALTH OF THE NAVY AND MARINE CORPS FOR THE YEAR 1895.

The average strength of the Navy and Marine Corps, including cadets at the Naval Academy, for the year 1895 was 13,191. Complete returns were received by the Medical Department from a total force, corrected for time, of 12,671, the difference representing crews of small vessels unprovided with medical officers, and persons on detached and special duty, on leave, waiting orders, and under other circumstances precluding all returns except reports of survey and certificates of death. The former number is therefore used in computing ratios of deaths and discharges from service for disability, and the latter in all other ratios.

Owing to the adoption of the present plan of gathering statistics, under which admissions for the continuance of a disease are not regarded as original cases, and, by an improved nomenclature, much greater accuracy in recording diagnoses is secured, it is not practicable to make complete comparisons with former years. It is, however, apparent from the returns for the total force that the health record for the calendar year 1895 has been relatively very satisfactory. The total number of admissions for disease and injury was only 10,625, which is in the ratio of 838.53 per 1,000 of average strength. The ratio for disease was 673.19 and for injury 165.34. The daily average of patients was 434.23, a ratio of 34.27 per 1,000, and the number of persons invalided from service (including retirements for disability) was 206, a ratio of 15.61 per 1,000. One hundred and seventy-six cases were invalided for disease and 30 on account of injuries, the ratios being, respectively, 13.34 and 2.27 per 1,000. The total number of sick days was 158,495, which is an average of 12.51 days for each man of the Navy and Marine Corps and of 14.92 days for each case treated.

The number of deaths was ninety, seventy from disease and twenty from injury (including poison). The death rate was 6.82 per 1,000 of strength (5.31 for disease and 1.51 for injury).

During the year there were admitted to the sick list of the total force 913 cases of malarial diseases, 657 of epidemic catarrh, 632 of rheumatic affections, 503 of diarrhœal affections, 187 of alcoholism, 92 of heat stroke, 63 of pneumonia, 42 of pneumonic tuberculosis, 36 of measles, 31 of typhoid fever, 25 of organic heart disease, 17 of nephritis, 13 of erysipelas, 6 of varicella, 3 of scarlet fever, 2 of cholera, and 1 each of mumps and smallpox. Of the 913 cases of malarial diseases returned from the whole service nearly one-fourth (213) occurred in Washington, D. C., at the navy-yard and marine headquarters (pages 35, 42, and 52). Of the 92 cases of heat stroke 58 were caused by heat in fire and engine rooms, 23 of the latter being returned from the *Amphitrite*, 8 from the *Detroit*, 7 from the *Raleigh*, 3 from the *Columbia*, and 2 each from the *Bennington*, *Atlanta*, *Monterey*, and *Olympia*, the remainder (9) occurring scattered, 1 on a ship. There was no case of yellow fever in the Navy during the year and but two cases of cholera, one being returned from the *Bennington* and one from the *Machias* (pages 45 and 47). The case of smallpox developed in a patient transferred from the *Columbia* to the hospital at Norfolk. The venereal diseases were represented by 330 cases of gonorrhœa, 239 of syphilis, and 152 of chancroid. There were 637 cases of wounds, 469 of contusion, 418 of sprain, 116 of burn, 96 of fracture, 44 of hernia, 40 of abrasion, 16 of concussion, 14 of luxation, and 9 of drowning. The prevalence of these special diseases and injuries on the various stations is shown in the detailed statement of the health of each station.

The deaths in the total force were due—10 each to pneumonia and heart disease; 8 each to drowning and local injuries; 7 each to pneumonic tuberculosis and nephritis; 6 to typhoid fever; 5 to apoplexy; 4 to aneurism; 3 each to intestinal obstruction and poison; 2 each to bronchitis, pleurisy, peritonitis, and cholera, and 1 each to cholera morbus, dysentery, remittent fever, rheumatism, suffocation in boiler, appendicitis, asthma, hepatitis, heat stroke, epidemic catarrh, and meningitis.

The deaths by violence and suicide are shown as follows:

Wounds, fractures, etc	5
Drowning	8
Asphyxiation in boiler	1
Suicide by shooting	1
Suicide by poisoning	1
Suicide by cutting throat	2

During the year 5,173 persons were vaccinated, and the total percentage of success was 24.37; 4,176 of these had marks of previous vaccinations and furnished 935 successful results.

INSANE OF THE NAVY.

The number of patients from the Navy and Marine Corps remaining in the Government Hospital for the Insane on June 30, 1895, was 69. During the following year 26 cases were admitted and 16 discharged, 7 as recovered, 3 improved, 1 unimproved, and 5 dead. On June 30, 1896, 79 (8 officers and 71 seamen and marines) remained in that institution.

NAVAL HOSPITALS.

SUMMARY FOR THE YEAR 1895.

Cases met with in the hospitals appear as a rule in the returns from the stations where the disease or injury was contracted. All such cases are indicated in Table XIV, page 78, in the column "Readmitted," while diseases or injuries first recorded in hospitals appear in the same table in the column "Admitted," and are regarded as original admissions.

NAVAL HOSPITALS, 1895.

Hospital.	Number of cases under treatment.				Number invalided from service.				Number dead.				Number discharged to duty.				Average number daily under treatment.	Average number of days' treatment per case.
	Remaining from last year.	Admitted during year.		Total.	Diseases.	Injuries.	Total.	Ratio per 1,000 of cases treated.	Diseases.	Injuries.	Total.	Ratio per 1,000 of cases treated.	Diseases.	Injuries.	Total.	Ratio per 1,000 of cases treated.		
		Diseases.	Injuries.															
Portsmouth, N. H	6	33	10	49	1	0	1	20.41	1	1	2	40.82	27	8	35	714.29	5.55	41.33
Chelsea, Mass	13	98	14	125	9	1	10	80.00	3	0	3	24.00	73	13	86	688.00	19.43	56.74
Brooklyn, N. Y. *a*	70	348	46	464	17	3	20	43.10	9	0	9	19.40	216	37	253	545.26	66.97	52.68
Philadelphia, Pa	14	185	21	220	24	3	27	122.73	3	0	3	13.64	132	16	148	672.73	21.98	36.46
Washington, D. C	14	137	7	158	5	1	6	37.97	6	0	6	37.97	111	5	116	734.18	15.47	35.74
Norfolk, Va	49	233	26	308	16	7	23	74.68	8	0	8	25.97	203	19	222	720.78	31.00	36.74
Pensacola, Fla	0	2	0	2	0	0	0	....	0	0	0	....	2	0	2	1,000.00	.14	25.00
Mare Island, Cal	64	181	21	266	34	4	38	142.86	5	1	6	22.56	166	16	182	684.21	46.47	63.76
Yokohama, Japan	4	45	2	51	3	0	3	58.82	0	0	0	....	31	1	32	627.45	7.62	54.53

a Owing to repair of building, 141 cases were transferred to other hospitals, chiefly to Philadelphia.

NAVAL HOSPITAL, PORTSMOUTH, N. H.

(*Statistics.*)

Medical Inspector J. B. PARKER, U. S. N., *In charge.*

During 1895 there were 49 cases under treatment, including 6 remaining from the previous year. The average number daily under treatment was 5.55 and the average number of days' treatment per case was 41.33. The nonvenereal diseases occurring most frequently were bronchitis, 5 cases; rheumatism, 4; intermittent fever, 3; and pharyngitis, 2.

Invaliding.—There was one discharge from the service for disability, the cause being irritatio spinalis. The ratio per 1,000 of all cases under treatment was 20.41.

Mortality.—Two deaths occurred, one from pneumonic tuberculosis and one from lacerated wounds (railway accident). The mortality rate per 1,000 of cases under treatment was 40.82.

Venereal diseases.—Seven cases of gonorrhœa, two of syphilis, and a sequela of the former disease were admitted during the year.

Injuries and poisons.—Under this class, 10 cases were admitted, 3 for alcoholism and 7 for injuries (3 wounds, 2 fractures, and 2 contusions).

NAVAL HOSPITAL, CHELSEA, MASS.

(*Statistics.*)

Medical Director J. H. CLARK, U. S. N., *In charge.*

There were 125 cases under treatment during the year, including 13 remaining from 1894. The average number of cases daily under treatment was 19.43 and the average number of days' treatment per case was 56.74. Of the 112 admissions during the year, 16 were due to remittent fever, 14 to rheumatism, 6 to bronchitis, 3 to tonsillitis; and 2 each to typhoid fever, pneumonic tuberculosis, pleurisy, epilepsy, and neurasthenia.

Invaliding.—Ten cases, in the ratio of 80 per 1,000, were invalided from the service. The causes were as follows: Pneumonic tuberculosis and syphilis, 2 cases each; and melancholia, paraplegia, disease of the heart, pleurisy, gonorrhœal arthritis, and hernia, 1 each.

Mortality.—There were 3 deaths, 1 from apoplexy, 1 from bronchitis, and 1 from pneumonic tuberculosis. The ratio per 1,000 of cases treated was 24.

Venereal diseases.—Fourteen cases of gonorrhœa, 6 of syphilis, 2 of chancroid, and 5 of the sequelæ of these diseases were admitted during the year.

Injuries and poisons.—Seven local injuries, 6 cases of alcoholism, and 1 case of lead poison were admitted.

NAVAL HOSPITAL, BROOKLYN, N. Y.

(*Statistics.*)

Medical Director E. S. BOGERT, U. S. N., and Medical Director T. N. PENROSE, U. S. N., *In charge.*

During 1895 there were 464 cases under treatment, 394 having been admitted during the year and 70 having remained from the previous year. Of the 394 admissions, 46 were for remittent fever, 33 for rheumatism, 13 each for pneumonic tuberculosis and epidemic catarrh, 11 each for bronchitis and pneumonia, 10 for disease of the heart, 8 for tonsillitis, 7 each for erysipelas and measles, 6 for typhoid fever, 5 each for intermittent fever, otitis media, and fistula in ano, 4 for pleurisy, and 3 each for abscess and disease of the kidneys. The average number of cases daily under treatment was 66.97, and the average number of days' treatment per case was 52.68.

Invaliding.—Twenty cases were invalided from service, the ratio per 1,000 cases under treatment being 43.10. The causes of invaliding were as follows: Syphilis, 4 cases; hernia, disease of the heart, melancholia, and rheumatism, 2 each; and pneumonic tuberculosis, astigmatism, necrosis, abscess, bubo, asthma, nephritis, and contusion, 1 each.

Mortality.—There were 9 deaths, 2 each caused by pneumonia and disease of the heart, and 1 each by pneumonic tuberculosis, pleuritis, epidemic catarrh, disease of the kidneys, and meningitis.

Venereal diseases.—Forty-two cases of syphilis, 9 of gonorrhœa, 4 of chancroid, and 32 of the sequelæ of those diseases were admitted during the year. Five cases were invalided from the service for diseases under this class.

Injuries and poisons.—Thirty-six local injuries (including 9 cases of fracture, 7 of wounds, 6 of contusion, 4 of sprain, and 3 of hernia) and 9 cases of poisoning by alcohol and 1 by lead were admitted during the year. There were no deaths under this class, but 3 cases were invalided from the service.

NAVAL HOSPITAL, PHILADELPHIA, PA.

(*Statistics.*)

Medical Director D. KINDLEBERGER, U. S. N., *In charge.*

Two hundred and six cases were admitted during the year and 14 remained from 1894, making the total number under treatment 220. Of those admitted 16 were for rheumatism, 15 each for remittent fever and pneumonic tuberculosis, 9 for disease of heart, 7 for measles, 5 for intermittent fever, 4 for bronchitis, 3 each for epidemic catarrh, appendicitis, and ulcus, and 2 each for cholelithiasis, nephritis, gastritis, hæmoptysis, monoplegia, hemiplegia, and typhoid fever. The average number daily under treatment was 21.98, and the average number of days treatment per case was 36.46.

Invaliding.—Twenty-seven cases were discharged from the service for disability, the ratio per 1,000 cases treated being 122.73. The causes of invaliding were: Pneumonic tuberculosis, 8 cases; rheumatism, 4; hernia, 3; hæmoptysis, 2; and dysentery, dementia, nephritis, enuresis, asthma, disease of the heart, retinitis, optic neuritis, monoplegia and hemiplegia, 1 each.

Mortality.—There were three deaths, due one each to aneurism, pneumonic tuberculosis, and heart disease. The death rate was 13.64 per 1,000 of cases treated.

Venereal diseases.—Thirty-four cases of syphilis, 4 of gonorrhœa, 3 of chancroid, and 17 of the sequelæ of those diseases were admitted during the year. No case under this class was invalided from the service.

Injuries and poisons.—There were 20 cases of local injuries admitted and one case of alcoholic poisoning. Among the injuries were 5 cases of hernia, 4 of stremma, 4 of fracture, and 3 of contusion. There were no deaths under this class and 3 cases (hernia) were invalided.

NAVAL HOSPITAL, WASHINGTON, D. C.

(*Statistics.*)

Medical Inspector GEORGE A. BRIGHT, U. S. N., *In charge.*

There were 158 cases treated during 1895, of which 144 were admitted during the year and 14 remained from 1894. The average number daily under treatment was 15.47, and the average number of days treatment per case was 35.74. Of the cases admitted 61 were for remittent fever, 8 for intermittent fever, 6 for rheumatism, 4 for pneumonia, 3 each for pneumonic tuberculosis, fistula in ano, and disease of the heart, and 2 each for carbuncle and typhoid fever, and 1 for epithelioma.

Invaliding.—Six cases were invalided from the service, being at the rate of 37.97 per 1,000 of cases treated. The causes were: Pneumonic tuberculosis, 3 cases, and remittent fever, melancholia and hernia, 1 each.

Mortality.—There were six deaths—two from pneumonia and one each from typhoid fever, remittent fever, acute rheumatism, and aneurism. The rate per 1,000 of cases under treatment was 37.97.

Venereal diseases.—Three cases of chancroid, 3 of gonorrhœa, 2 of syphilis, and 10 of the sequelæ of those diseases were admitted during the year. No case under this class was invalided from service.

Injuries and poisons.—Five local injuries and 2 cases of poisoning (alcoholic) were admitted. The injuries were 3 wounds, 1 case of stremma, and 1 of hernia.

NAVAL HOSPITAL, NORFOLK, VA.

(*Statistics.*)

Medical Director C. J. CLEBORNE, U. S. N., *In charge.*

Three hundred and eight cases were under treatment during 1895. Two hundred and fifty-nine cases were admitted during the year, and 49 remained from 1894. Among those admitted were 20 cases of rheumatism, 12 of intermittent fever, 10 of remittent fever, 9 of pneumonia, 7 each of pneumonic tuberculosis, measles, and disease of the heart, 6 of bronchitis, 4 each of typhoid fever, scabies, and eczema, and 3 each of fistula in ano and hæmorrhoids. The average number of cases daily under treatment was 31, and the average number of days treatment per case was 36.74.

Invaliding.—Twenty-three cases were invalided from the service, being at the rate of 74.68 per 1,000 of cases treated. The causes were: Rheumatism and hernia, 3 cases each; melancholia, varix, and wounds, 2 each, and intermittent fever, syphilis, diabetes, epilepsy, vertigo, disease of the heart, hæmorrhoids, urinary fistula, nephritis, contusion, and morphine habit, 1 each.

Mortality.—There were 8 deaths—3 from pneumonia, 2 from typhoid fever, and 1 each from pneumonic tuberculosis, aneurism, and disease of the heart. The ratio per 1,000 cases treated was 25.97.

Venereal diseases.—Twenty-two cases of syphilis, 11 of gonorrhœa, 6 of chancroid, and 30 of the sequelæ of those diseases were admitted during the year. Under this class two cases were invalided.

Injuries and poisons.—Twenty-four cases of local injuries and 2 of poisoning were admitted during the year. Among the injuries were 6 cases each of fracture and contusion, 4 of wounds, and 2 of hernia. Both cases of poisoning resulted from the use of morphine.

NAVAL HOSPITAL, MARE ISLAND, CAL.

(*Statistics.*)

Medical Director GEORGE W. WOODS, U. S. N., *In charge.*

Two hundred and two cases were admitted during 1895, and 64 remained from 1894, the total under treatment during the year being 266 cases. Among those admitted were 23 cases of epidemic catarrh, 16 of rheumatism, 5 each of disease of the heart, melancholia, and pleurisy; 4 each of pneumonic tuberculosis, tonsillitis, mania, and dementia; and 3 each of remittent fever, malarial cachexia, epilepsy, bronchitis, and bronchial catarrh. The average number daily under treatment was 46.47, and the average number of days treatment per case was 63.76.

Invaliding.—Thirty-eight cases were invalided from the service, the ratio per 1,000 of cases under treatment being 142.86. The causes of invaliding were: Syphilis, 4 cases; pneumonic tuberculosis, mania, and dementia, 3 each; rheumatism, epilepsy, and hernia, 2 each; and epidemic catarrh, alcoholism, pneumonia, melancholia, myelitis, ulcer of cornea, retinitis, intestinal catarrh, hæmorrhoids, fracture, gastric ulcer, disease of heart, bronchitis, bronchial catarrh, clavus, chancroid, orchitis, spermatorrhœa, and osteoma, 1 each.

Mortality.—There were six deaths—one each from fracture of skull, disease of heart, intestinal obstruction, typhoid fever, nephritis, and purulent pleurisy. The mortality rate per 1,000 of cases under treatment was 22.56.

Venereal diseases.—Eighteen cases of syphilis, 8 of gonorrhœa, 2 of chancroid, and 15 of the sequelæ of those diseases were admittted during the year. Six cases were invalided under this class.

Injuries and poisons.—Eighteen local injuries and 3 cases of poisoning (alcoholic) were admitted during the year. Among the injuries were 7 cases of fracture and 4 of hernia. One death and 4 invalidings occurred under this class.

NAVAL HOSPITAL, YOKOHAMA, JAPAN.

(*Statistics.*)

Surgeon PAUL FITZSIMONS, U. S. N., *In charge.*

Fifty-one cases were under treatment during the year; 47 were admitted during 1895 and 4 remained from 1894. Among those admitted were: Pneumonic tuberculosis, 4 cases; rheumatism and bronchitis 3 each, and typhoid fever, 2. The average number of cases daily under treatment was 7.62, and the average number of days' treatment per case was 54.53. Three cases were invalided from service, 1 each for melancholia, disease of the heart, and pneumonic tuberculosis. There were no deaths. Seven cases of syphilis, 2 of chancroid, 1 of gonorrhœa, and 8 of the sequelæ of venereal disease were admitted during the year.

FORCE AFLOAT.

(*Statistics.*)

The average strength of the force afloat was 10,042. The average number of admissions to the sick list per man on the cruising vessels of the North Atlantic Station was 0.99; on those of the Pacific Station, 0.75; in the South Atlantic squadron, 0.93; in the European squadron, 0.83; in the Asiatic squadron, 0.78; on the Northwestern Lakes, 0.35, and on the receiving ships and other stationary vessels, 0.62.

The admissions for parasites and parasitic diseases were in the ratio of 2.11 per 1,000; general infectious diseases (nonvenereal), 156.34; constitutional disorders of nutrition, 3.39; diseases of the nervous system, 66.72; of the visual apparatus, 9.56; of the auditory apparatus, 6.07; of the digestive apparatus, 129.95; of the circulatory apparatus, 6.77; of the respiratory apparatus, 72.79; of the motory apparatus, 36.15, and of the cutaneous apparatus, 62.64. The venereal diseases and diseases of the genito-urinary apparatus were in the ratio of 109.04 per 1,000; cysts and new growths, 1.39; injuries, 153.26; extraneous bodies, 0.40; poisons (including alcoholism), 18.22, and feigned diseases, 0.40.

The deaths numbered 58, 37 occurring afloat and 21 in hospital, which is in the ratio of 5.77 per 1,000 of force (3.68 afloat and 2.09 in hospital).

The prevalence of special diseases and the causes of deaths are shown in the following detailed statement of the various stations.

NORTH ATLANTIC STATION.

(*Statistics.*)

There were 23 cruising vessels employed on the North Atlantic Station in the year 1895, viz: Three battle ships, 1 armored cruiser, 5 protected cruisers, 1 monitor, 1 dynamite gun vessel, 4 cruisers, 1 practice vessel, 1 dispatch boat, 1 transport steamer, 2 sailing ships, 2 surveying vessels, and 1 Fish Commission vessel. The mean force corrected for time was 3,698, and the total number of cases admitted to the sick list was 3,650, being in the ratio of 987.02 per 1,000.

The number invalided from service was 63 and the number of deaths was 16; the ratio in the former case being 17.04, and in the latter, 4.33 per 1,000 of strength. The number transferred to hospital was 405, being in the ratio of 109.52 per 1,000 of force and of 110.95 per 1,000 of admissions.

The deaths were due, 4 to pneumonia, 3 to drowning, 2 each to heart disease and typhoid fever, and 1 each to aneurism, nephritis, acute rheumatism, chronic pleurisy, and poison (suicide). Five of these deaths occurred afloat and 11 in hospital.

During the year there were admitted to the sick list 283 cases of malarial diseases, 240 of rheumatic affections, 141 of diarrhœal affections, 103 of epidemic catarrh, 52 of heat stroke, 48 of alcoholism, 19 of pneumonia, 15 of measles, 14 of disease of the heart, 11 of pneumonic tuberculosis, 8 of typhoid fever, and 3 of drowning. The venereal diseases were represented by 97 cases of gonorrhœa, 76 of syphilis, and 49 of chancroid.

The most prevalent diseases, other than those mentioned, were tonsillitis, 206 cases; bronchial catarrh, 183; simple fever, 126; abscess, 120; bronchitis, 107; furuncle, 98; adenitis, 92; colic, 80; pharyngitis, 74; neuralgia and orchitis, 44 each; rhinitis, 31; otitis, 29; gastritis, 25; conjunctivitis, 23, and hemorrhoids, 21. There were 241 cases of wounds, 198 of contusion, 151 of sprain, 43 of burn, 21 of fracture, and 12 of hernia.

The cases of epidemic catarrh occurred chiefly on the *Minneapolis* (46 cases), *Columbia* (15 cases), *New York* (10 cases), and *Cincinnati* (7 cases). The cases of measles occurred on the *New York*, *Indiana*, and *Alliance*. Of the 52 cases of heat stroke, 23 occurred on the *Amphitrite*, 8 each on the *Raleigh* and *Atlanta*, 4 on the *Columbia*, 3 on the *New York*, 2 each on the *Texas* and *Cincinnati*, and 1 each on the *Montgomery* and *Bancroft*.

PACIFIC STATION.

(Statistics.)

The vessels cruising on the Pacific Station in the year 1895 numbered seventeen, viz: Two protected cruisers, 1 partially protected cruiser, 6 cruisers, 1 monitor, 2 gunboats, 4 surveying vessels, and 1 vessel of the Fish Commission. The mean force corrected for time was 1,952 and the total number of admissions to the sick list was 1,465, a ratio of 750.51 per 1,000.

The number invalided from service was 37, a ratio of 18.95 per 1,000 of strength, and the number of deaths was 7, the death rate being 3.95 per 1,000.

The number transferred to hospital was 171, being in the ratio of 87.60 per 1,000 of force and 116.72 per 1,000 of admissions.

The deaths were due, 1 each to pneumonia, thermic prostration, pneumonic tuberculosis, apoplexia, cholera, fractured skull, and incised wound (self-inflicted, in a case of melancholia).

During the year there were admitted to the sick list 127 cases of epidemic catarrh, 86 of malarial disease, 76 of diarrhœal affections, 70 of rheumatic affections, 35 of alcoholism, 10 each of heat stroke and heart disease, 5 each of pneumonia and typhoid fever, 3 of pneumonic tuberculosis, and 1 each of scarlet fever and cholera. There were 33 cases of gonorrhœa, 29 of syphilis, and 12 of chancroid. The most prevalent diseases other than those mentioned were bronchial catarrh, 72 cases; tonsillitis, 52; abscess, 51; simple fever, 49; furuncle, 30; colic, 25; adenitis, 23; bronchitis, 22; neuralgia, 21, and laryngitis and pharyngitis, 14 each. There were 130 cases of wounds, 61 of contusion, 57 of sprain, 32 of burn, 19 of fracture, and 8 of hernia.

The cases of epidemic catarrh occurred chiefly on the *Bennington* (47), *Monterey* (33), and *Philadelphia* (23). Of the 10 cases of heat stroke, 3 each were returned from the *Bennington* and *Monterey*, 2 from the *Olympia*, and 1 each from the *Alert* and *Ranger*. The case of scarlet fever occurred on the *Olympia* and that of cholera on the *Bennington* during her stay at Honolulu (page 45).

SOUTH ATLANTIC STATION.

(*Statistics.*)

Three vessels constituted the South Atlantic Squadron during the year 1895, viz: One protected cruiser, 1 cruiser, and 1 gunboat. All three vessels were in commission during the entire year, and their average complement was 611. The number of admissions to the sick list was 567, which is in the ratio of 927.99 per 1,000 of mean strength.

The number invalided from service was 9, and the number of deaths was 2, the former ratio per 1,000 being 14.73 and the later 3.27.

The daily average of patients was 15.15, which is in the ratio of 24.79 per 1,000. The number transferred to hospital was 12, in the ratio of 19.64 per 1,000 of strength and 21.16 per 1,000 of admissions.

Two deaths occurred, 1 in the force afloat and 1 in hospital, and were due to disease of the heart and asphyxia (in boiler).

During the year there were admitted to the sick list 120 cases of epidemic catarrh, 49 of rheumatic affections, 22 of diarrhœal affections, 6 of malarial diseases, 5 of alcoholism, 3 of pneumonia, and 1 each of pneumonic tuberculosis, thermic prostration, and disease of the heart. The venereal diseases were represented by 13 cases of gonorrhœa, 10 of syphilis, and 9 of chancroid.

The most prevalent diseases other than those mentioned were: Tonsillitis, 31 cases; bronchial catarrh, 25; abscess, 23; bronchitis, 19, and gastric catarrh, 9. There were 33 cases of wounds, 22 of contusion, 16 of sprain, 7 of fracture, 5 of burn, and 4 of hernia. The cases of epidemic catarrh occurred chiefly on the *Newark*, and were contracted during the stay of that ship at Cape Town. The disease was of a mild type.

EUROPEAN STATION.

(*Statistics.*)

Three ships constituted the European Squadron during the year 1895, viz: One protected cruiser, 1 partially protected cruiser, and 1 cruiser. The mean force, corrected for time, was 742, and the number of admissions to the sick list was 617, which is in the ratio of 831.54 per 1,000.

The number invalided from service was 6, the ratio being 8.09 per 1,000 of strength, and the number of deaths was 7, in the ratio of 9.43 per 1,000.

The deaths were due, 2 to pneumonic tuberculosis and 1 each to nephritis, pneumonia, bronchitis, disease of the heart, and intestinal obstruction. Four deaths occurred in the force afloat and 3 in hospital.

During the year there were admitted to the sick list 90 cases of malarial diseases, 61 of rheumatic affections, 20 of epidemic catarrh, 12 of diarrhœal affections, 7 of alcoholism, 5 of pneumonia, and 2 each of scarlet fever and disease of the heart. The venereal diseases were represented by 15 cases of gonorrhœa, 13 of chancroid, and 12 of syphilis. The most prevalent diseases other than those stated were: Bronchial catarrh, 37 cases; simple fever, 19; neuralgia, 18; bronchitis, 16; cholera morbus and abscess, 14 each; cephalalgia, 12; colic, 10; ulcer, 8, and pleurisy and gastric catarrh, 7 each. There were 27 cases of sprain, 25 of wounds, 24 of contusion, 8 of burn, and 2 of hernia.

The cases of epidemic catarrh occurred on the *Marblehead*. This ship also returned more than one-third of the malarial diseases, many cases of so-called Mediterranean fever occurring on board being classed as febris remittens. This disease furnished more than one-third of the total number of sick days of the vessel and more than half of the transfers to hospital. A short statement relating to origin and some account of this fever appear on pages 47 and 54.

ASIATIC STATION.

(*Statistics.*)

The squadron on the Asiatic Station in 1895 was composed of 8 vessels, viz: Two protected cruisers, 2 cruisers, and 4 gunboats.

The returns from all these vessels were for the entire year. The mean strength of the squadron was 1,669, and the total number of admissions to the sick list 1,300, being a ratio per 1,000 of 778.91.

The number invalided from service was 11, the ratio being 6.59 per 1,000 of strength, and the number of deaths 10, in the ratio of 5.99 per 1,000. The daily average of patients was 35.95, in the ratio of 21.54 per 1,000, and the number transferred to hospital during the year was 55, being in the ratio of 32.95 per 1,000 of strength and 42.31 per 1,000 of admissions.

The deaths all occurred in the force afloat, as not one of the cases invalided to a naval hospital terminated fatally. The causes were: Drowning, 3 cases; and cholera, cholera morbus, dysentery, asthma, abscess of the liver, peritonitis, and concussion of the brain, 1 each.

During the year there were admitted to the sick list 113 cases of diarrhœal affections, 55 of malarial diseases, 43 of rheumatic affections, 38 of epidemic catarrh, 29 of alcoholism, 18 of heat stroke, 10 of pneumonia, 3 of drowning, 2 of pneumonic tuberculosis, and 1 each of cholera and disease of the heart. The venereal diseases were represented by 88 cases of gonorrhœa, 46 of chancroid, and 37 of syphilis. The most prevalent diseases other than those mentioned were: Tonsillitis, 59 cases; bronchial catarrh, 57; adenitis, 53; furuncle, 37; bronchitis and orchiti, 26 each; colic, 20; simple fever, 18; epididymitis, 16; hepatic congestion, 12, and gastritis and arthritis, 11 each. There were 75 cases of wounds, 61 of contusion, 38 of sprain, 16 of fracture, 9 of burn, and 3 of hernia.

The cases of epidemic catarrh occurred chiefly on the *Charleston*, while of the 18 cases of heat stroke 13 were returned from the *Detroit*. The case of cholera originated at Shanghai during the stay of the *Machias* at that port (p. 47).

NORTHWESTERN LAKES.

(*Statistics.*)

The one vessel, a cruiser, employed on the Northwestern Lakes was in commission during the entire year. The average complement was 93 and the total number of admissions to the sick list was 33,being in the ratio of 354.84 per 1,000.

There were no deaths and but one discharge from the service for disability, the ratio being 10. 75 per 1,000 of strength.

The daily average of patients was 0.73, which is in the ratio of 7.85 per 1,000, and the number transferred to hospital was 1, the ratio being 10.75 per 1,000 of force, and 33.33 per 1,000 of admissions.

During the year there were admitted to the sick list 5 cases of rheumatic affections, 3 of diarrhœal affections, and 1 of malarial disease.

The venereal diseases were represented by 4 cases of syphilis, 2 primary and 2 secondary. There were 5 cases of contusion, 3 of wounds, and 1 each of sprain and burn.

RECEIVING SHIPS AND OTHER STATIONARY VESSELS.

(*Statistics.*)

These vessels, consisting of the *Wabash*, *Vermont*, *Richmond*, *Franklin*, *Independence*, *Minnesota*, and the monitor *Ajax*, and other monitors practically in ordinary, had a mean complement during the year of 1,277. The total number of admissions to the sick list was 798, being in the ratio of 624.90 per 1,000.

The number invalided from service was 19, a ratio of 14.88 per 1,000 of strength, and the number of deaths was 16 (10 occurring on board and 6 in hospital), the death rate being 12.53.

The number transferred to hospital was 147, being in the ratio of 115.11 per 1,000 of force and of 184.44 per 1,000 of admissions.

The deaths were due, 3 to nephritis, 2 to disease of the heart, and 1 each to pneumonia, pneumonic tuberculosis, alcoholism, intestinal obstruction, peritonitis (following rupture of bladder), bronchitis, epidemic catarrh, purulent pleurisy, punctured wound, drowning, and incised wound (suicide).

During the year there were admitted to the sick list 73 cases each of epidemic catarrh and malarial diseases, 60 of rheumatic affections, 25 of alcoholism, 15 of diarrhœal affections, 8 of disease of the heart, 7 of pneumonia, 6 each of measles and heat stroke, 4 of typhoid fever, 2 of pneumonic tuberculosis, and 1 of drowning. There were 33 cases of gonorrhœa, 22 of syphilis, and 11 of chancroid. The most prevalent diseases other than those mentioned were: Bronchitis, 40 cases; tonsillitis, 35; cholera morbus, 17; bronchial catarrh, 15; simple fever, pharyngitis, and abscess, 13 each, and gastritis, 11. There were 39 cases of sprain, 30 of wounds, 27 of contusion, 7 of fracture, and 3 of hernia.

The majority of the cases of epidemic catarrh (48) occurred on the *Vermont*, on which vessel there were also 3 cases of typhoid fever and 5 of measles. One case of measles and 1 of typhoid fever were returned from the *Richmond*.

NAVY-YARDS, MARINE BARRACKS, AND OTHER SHORE STATIONS.

(*Statistics.*)

The various navy-yards and other shore stations had a mean force during the year of 2,365. The total number of admissions to the sick list was 2,049, which is in the ratio of 866.38 per 1,000.

The number invalided from service was 55, a ratio of 23.26 per 1,000, and the number of deaths was 29 (14 occurring in hospital), the death rate being 12.26 per 1,000.

The number transferred to hospital was 313, a ratio of 132.35 per 1,000 of force and 152.76 per 1,000 of admissions.

The deaths were due, 4 each to typhoid fever, disease of the heart, and apoplexy; 3 each to pneumonia and pneumonic tuberculosis, 2 each to nephritis and aneurism, and 1 each to remittent fever, intestinal obstruction, appendicitis, lacerated wound, fractured skull, drowning, and gunshot wound (suicide).

During the year there were admitted to the sick list 311 cases of malarial diseases, 174 of epidemic catarrh, 117 of diarrhœal affections, 99 of rheumatic affections, 34 of alcoholism, 14 of measles, 13 of pneumonic tuberculosis, 9 each of typhoid fever and disease of the heart, 8 of pneumonia, 5 each of heat stroke and varicella, and 1 of drowning. There were 49 cases of gonorrhœa, 23 of syphilis, and 12 of chancroid. The most prevalent diseases other than those mentioned were: Tonsillitis, 97 cases; bronchitis, 79; bronchial catarrh, 59; abscess, 41; furuncle, 34; pharyngitis, 30; simple fever, 25; colic, 23; conjunctivitis, 20; neuralgia, 19; adenitis, 16; orchitis, 11, and rhinitis and gastritis, 10 each.

There were 99 cases of wounds, 89 of sprain, 67 of contusion, 22 of fracture, and 11 each of burn and hernia.

More than one-half (163) of the malarial diseases occurred at the Washington Navy-Yard and 50 were returned from the Marine Headquarters. Thus 213 of the 305 cases can be ascribed to local conditions in Washington (page 52). Six cases of typhoid fever were returned from the Newport Station, 1 from the New York yard, 1 from the Naval Academy, and 1 from Washington, D. C. Thirteen cases of measles occurred at the Newport Station, and 5 cases of varicella at the Naval Academy. The cases of epidemic catarrh developed chiefly at the Newport Station (76), Naval Academy (43), Marine Headquarters (14), and New York yard (14).

SELECTED MEDICAL, SURGICAL, AND SANITARY NOTES FROM SHIPS, SHORE STATIONS, AND HOSPITALS.

SHIPS.

U. S. S. ALERT.

(Note.)

L. W. Spratling, *Passed Assistant Surgeon.*

Febris enterica.—On April 19, when the ship had been at Panama more than three weeks, an apprentice (second class), aged 17 years, reported at sick call, stating that he had felt unwell for three days, during which time there had been persistent constipation. On admission he had a temperature of 103.4°, pulse 96, severe frontal headache, general aching pains, and severe nausea and cough. There was no history of a chill. He was given a saline cathartic and 20 grains of quinine during the day, but in the evening the temperature was 105°. On the next morning temperature was 103.8°. Once during that day his sputum was blood-streaked, which was accounted for by a general congestion of the throat. On examination of the chest, a few râles were found in the larger tubes. On April 21 he had a severe epistaxis, which was finally controlled by the administration of ergot. At 6 p. m. his temperature was 106° and pulse 120, and he was actively delirious. In two hours the temperature had been reduced to 104° by sponging, and patient was sleeping. Bowels were loose, stools being frequent and watery. Tongue was heavily coated save at the edges, which were red. There was neither gurgling nor abdominal tenderness even on pressure in the right iliac region at any time during the course of the disease, nor did any eruption appear. During the afternoon of the 22d there was another severe attack of epistaxis, which required ergot for its control. From this time until the 27th the temperature ranged from 102° to 103° in the morning, and from 104° to 105° in the evening. He was rapidly losing strength and becoming more nervous, the ordinary noises of the ship annoying him painfully. On April 27 he was transferred to the French hospital, where his improvement was immediate, the temperature remitting more markedly. From that hospital he was discharged to his ship, convalescent, on May 10. Two other cases of the same nature occurred, though of a somewhat less violent type. One was first admitted as with acute pharyngitis, but was under treatment for thirty-six days with what was considered typhoid fever. There also occurred six cases of remittent fever, which averaged only six and one-half sick-days. The treatment was calomel and saline cathartic followed by sulphate of quinine pushed to point of toleration. These cases seemed to differ from those classed as typhoid only in degree of severity. The medical opinion at Panama appeared to be that typical typhoid fever was unknown there, and that the three first cases were representatives of that disease as it obtains at Panama.

U. S. S. ALLIANCE.

(*Note.*)

JAMES F. LEYS, *Assistant Surgeon.*

Tuberculosis.—On May 30 an apprentice (third class), aged 17 years, was admitted with lymphadenitis in left axilla, where there was a tumor as large as an egg. The boy's general condition was not good, and in spite of treatment he steadily lost flesh and color. There were no signs of suppuration in the tumor, but there was persistent general elevation of temperature, reaching at times 101.5° in the evening. When at Tangier, Morocco, on July 5, there being no improvement in his condition, all the involved axillary glands were dissected out under ether. A curved incision 3½ inches long was made over anterior axillary fold, the sheath of the axillary vessels was exposed, and the space below the pectoralis major invaded about 1½ inches forward. The deeper glands were much more disorganized than those lying superficially. In all, about eight or ten were removed. The operation was accomplished without hæmorrhage, the cavity packed, and the wound dressed antiseptically. The temperature reached 103.8° after the operation, but under quinine and stimulating treatment the general disturbance subsided and the wound did well. However, on July 18 it became apparent that the trouble had not been confined to the axilla, for there was a capillary bronchitis and pleuritis found at apex of right lung. Under tonics, cod-liver oil, stimulants, and special exercise he continued to improve, and from August 15 to September 27 performed light duty. His temperature, however, was never normal in the evening during that period. On the latter date the elevation of temperature became more marked, and this was aggravated on October 2 by sleeping in a draft, his hammock having been misplaced. The ship being at New York he was transferred to hospital, October 4, with tuberculosis.

U. S. S. BENNINGTON.

(*Note.*)

C. T. HIBBETT, *Surgeon.*

Febris remittens.—Twelve cases of remittent fever occurred during the first quarter of the year, 2 before the ship sailed from Mare Island for the Mexican coast, 8 after arrival at Acapulco, in men who had not been ashore at that place, and 2 after leaving Acapulco, not one of whom had been ashore. Fifty per cent of the cases were among the engineer's force. While there had been a number of cases of fever on the *Bennington* during the previous summer when at La Libertad, there seemed to be no connection between the two invasions, as the types were different, and the recent cases were among men who were not on board at La Libertad. Besides, during the course of the repairs at Mare Island, from September to December, 1894, all the storerooms had been broken out, thoroughly cleansed, and painted. The ship had also been fumigated after her return from Salvador. In view of these hygienic measures and the continued cleanliness of all parts of the ship, it was not believed that the recent cases of fever were due to any local condition on board. The most probable source of infection was considered to be the marsh under and back of the coal-dock wharf at Mare Island Navy-Yard, alongside of which the *Bennington* was secured from January 12 to January 31. This wharf is an open wood structure on high piles, at the margin of a marsh which extends back about 50 yards from the water.

Cholera.—While at Honolulu, August 29, an apprentice (first class), aged 20 years, was attacked about 9 p. m. with vomiting and purging, which followed a slight diarrhœa, for which he had not applied for treatment. He soon presented all the signs and symptoms of cholera, and in spite of active and persistent treatment, died the next morning at 7.55. Muscular movements in extremities and chest continued for thirty minutes after the last respiratory act. The superficial veins were prominently distended. Cases of cholera had occurred in the city, though none had appeared between August 23 and August 29. It was considered that the disease in his case was contracted by bathing in the water of the harbor. The boy had not been on shore since August 9, and there was no reason to believe that the restricted supply of fresh food from the city was infected. In addition to the usual precautions taken during the progress of the case to prevent infection of attendants and ship, the body immediately after death was wrapped in a sheet wet with bichloride solution and removed at once from the ship for burial. All bedding, clothing of attendants, and other dangerous articles used in the case, including all clothes of patient, were burned. The sick bay was washed with a 1–500 bichloride solution and the water-tight compartment fumigated with sulphur. The water of the harbor was no longer used for any purpose. On August 31 the ship was moved to an anchorage in deep water outside the harbor and on the following day the holds, storerooms, and living spaces were fumigated with sulphur. New cases of cholera occurring in the city, the ship sailed on September 7 for Lahaina, island of Maui. From August 27 to September 8 there occurred among the officers and crew a number of cases of diarrhœa and two cases of cholera morbus. The former were attributed to the influence of tropical climate and season and the latter to acute indigestion, one appearing in a reputed gormandizer, who was relieved after vomiting a beef bone of considerable size. In both cases of cholera morbus there was recovery in a few hours without marked depression.

U. S. S. CHARLESTON.

(*Note.*)

C. U. GRAVATT, *Surgeon.*

Febris pneumonica.—The disease set in with marked severity, and on the second day death seemed imminent from suffocation. Respiration rose to 64 per minute and was extremely painful. Age of patient was 25, and disease was confined to lower portion of right lung. Inhalation of the outer air (temperature 34° F.) by means of a tube and funnel was resorted to, and the whole aspect of the case was promptly changed. The respiration became easy and reduced to 30, cough was diminished, and temperature lowered. Temperature became normal by crisis on fourth day and a good recovery was made.

Congestio pulmonalis.—A cook, aged 43, after a chill, had a sudden rise of temperature to 104° F., accompanied by rapid and painful respiration and all the indications of impending pneumonia. Cold air, temperature 38° F., was employed by inhalation, as in the previous case, and a prompt subsidence of all the symptoms followed.

The disease did not advance beyond the stage of congestion.

U. S. S. CINCINNATI.

(*Note.*)

C. A. SIEGFRIED, *Surgeon.*

Amputation left forearm (*middle third*).—On February 5, at 12 m., an assistant engineer with his left forearm and hand mangled was assisted up out of the engine room. The medical officer being near by, the hæmorrhage was immediately controlled and the patient placed in a cot on the port side of the quarter deck. After the disappearance of the severe shock, the ship having in the meantime come to anchor off St. Thomas, the forearm was amputated at the middle third, the operation being completed by 7 p. m. There was much bruising and pulping of the muscular tissues and the bones were comminuted. As the skin was irregularly torn and cut, the flaps were irregular and many stitches were required. Above the flaps several skin bruises were apparent. The usual antiseptic precautions and dressings were employed and a molded splint applied to secure immobility. Owing to the oozing in the first twenty-four hours, the dressing was renewed on the third day. Small doses of morphia and atrophia were given the first night, and on the second day small amounts of phenacetin. He was transferred from the *New York*, where he had had the use of an unoccupied upper-deck cabin from the third day, to the naval hospital at Brooklyn on February 27, at which date the stump had nearly healed. The accident was supposed to have been due to the slipping of one foot on a circular floor plate when the left hand passed into the moving machinery in the attempt to find support.

U. S. S. ESSEX.

(*Note.*)

H. B. FITTS, *Passed Assistant Surgeon.*

Epidemic pharyngitis.—About a week after leaving Newport, R. I., for Barbados, an epidemic of pharyngitis appeared among the apprentices. It continued two weeks and attacked 30 of the crew. The boys sleep on the berth deck and the men under the forecastle. Very few of the men and only one officer had the disease. The latter was attacked a week after the cessation of the epidemic, forty-six hours after the bedding of the crew had been aired, while he was officer of the deck. It was supposed that the germs were introduced on board from the Naval Training Station at Newport and their propagation favored by the crowded condition of the vessel. Although there was some resemblance between the symptoms of this disease and those of catarrhus epidemicus, a few cases of which occurred about the same time, the differences were sufficiently marked to indicate two separate and distinct diseases, or at any rate two distinct species of the same disease. The average duration of the sickness was from three to four days. It was characterized by fever, headache, dizziness, and general malaise, beginning twenty-four hours before the throat became affected. Then, after two days of severe inflammation of the pharynx, there would be a slight extension to the bronchial and nasal passages, and a subsidence of the fever and other constitutional disturbance. The patient would be left pale and debilitated for a few days.

U. S. S. INDEPENDENCE.

(*Note.*)

J. R. WAGGENER, *Surgeon.*

Lipoma.—On May 23 a small lipoma was removed from the palm of the right hand of a musician 30 years old. Operation was performed under cocaine. The wound, closed with silk sutures, healed by first intention, and the man was discharged to duty in one week. Diagnosis was confirmed by microscopical examination.

U. S. S. LANCASTER.

(*Note.*)

C. G. HERNDON, *Surgeon.*

Assumed melancholia.—A coal passer was admitted December 12 as with melancholia, and remained on the sick list for three days. He feigned with considerable skill the type of melancholia with delusions of persecution, subjected some of his shipmates to obscene abuse, and even made a mock attempt to jump overboard. When his sham was discovered he was put under special surveillance, which was the means of effectually discouraging any further attempts to feign insanity.

U. S. S. MACHIAS.

(*Note.*)

T. B. BAILEY, *Passed Assistant Surgeon.*

Cholera.—One of the crew, a coal passer, who had been on shore at Shanghai four days previously, developed cholera on September 12, and was at once taken to the Shanghai general hospital. Two hundred and fifty cubic centimeters of warm saline solution were injected into the left cephalic vein, enemeta of a hot saline solution were frequently administered, camphor and other stimulants given hypodermically, and heat was applied to the surface. The patient rallied and passed into the stage of reaction. On the twelfth day of his illness the *Machias* left Shanghai, and he was then in a low typhoid state, but apparently with fair prospects of recovery. He, however, was unable to bear the ravages of the disease, and died on October 12, one month after the seizure. At Shanghai the cholera ward of the general hospital contained nearly every day from three to five cases. These patients came chiefly from merchant vessels. In the hospital for Chinese of the European concessions there were, it seems, more cases than in the general hospital. As to the state of affairs in the old Chinese town of Shanghai, no reliable information could be obtained. Rumor put the mortality from cholera anywhere from 30 to 200 per diem.

U. S. S. MARBLEHEAD.

(*Note.*)

EDWARD H. GREEN, *Surgeon.*

Continued fever.—There existed on the *Marblehead* an epidemic of fever which was classed as "remittent fever." Many of the cases from the disturbances of the nervous system and the daily exacerbation of temperature resembled typhoid fever, but the abdominal symptoms were usually absent (no tenderness on pressure nor gurgling in the right iliac fossa and generally no diarrhœa), and there was no eruption. The cases had an uncertain period of incubation, the earliest appearing on June 5 and the last on September 21. All the cases were marked by a slow and tedious convalescence, and by frequent relapses. The disease dragged along for months instead of weeks. Only two of the cases presented symptoms of bronchial catarrh; the majority had "grippe" pains in the head, back, and limbs, and marked gastro-intestinal disturbance, furred tongue, anorexia, and constipation. A similar fever occurring among French troops was considered a form of "grippe," affecting the gastro-intestinal mucous membrane. The ship cruised in the Mediterranean for two months (April and May), visiting ports in Asia Minor, the Piræus, and Algiers. This type of fever has been called Mediterranean fever and Algerian fever. It may be that exposure to the morbific cause took place during those two months. The exciting cause can probably be found in the stay of the ship for eleven days at Hamburg, where the dirty water of the Elbe was used to wash decks, and the sojourn of a week off St. Petersburg in the Neva River, where most of the cases began to develop. From the time of leaving Hamburg (June 20) the cases appeared at intervals, 20 in all. Thirteen were transferred to the hospital, 3 at Copenhagen July 21 and 10 at Gibraltar August 22. One returned from the hospital at Copenhagen, but was admitted to the sick-list immediately on account of weakness and slight fever. The following is a short summary of some of the typical cases:

A seaman, aged 23 years, was admitted to the sick list June 5. He had a pronounced chill and fever at the start, but after two days the temperature became normal. On June 8, temperature rose to 102° in the morning and was 104° in the evening. He had headache, pains in the back, and gastro-intestinal disturbance, but the nervous system was not greatly disturbed. On the 14th, temperature again became normal and remained so for four days, when there was another onset of fever, the thermometer recording 105.6° on the 22d. On the 23d, temperature morning and evening was 104°. On June 27 patient was transferred to naval hospital at Kiel, but on his return to the ship on July 25 suffered from general malaise, loss of appetite, and fever ranging from 99° to 100° in the morning and from 101° to 102° in the evening. This condition lasted for weeks, and on August 22 he was transferred to the hospital at Gibraltar, having been sick for nearly three months.

A coal passer on June 25 at Kiel had a chill, headache, and pains in limbs. Temperature continued 102° in the morning and 103° in the evening, but became normal on July 10. The fever recurred with daily exacerbations, marked gastro-intestinal disturbance, furred tongue, anorexia, constipation, and profound weakness. He was transferred to hospital at Gibraltar August 22.

A carpenter's mate, aged 36 years, was admitted June 25 at Kiel. System was profoundly disturbed from the beginning. Temperature in the morning was 102° and in the evening 104°. In a few days he became dull and apathetic, and had low muttering delirium. On July 13 the temperature became normal, but a slight rise occurred on the evening of the 14th. On the 15th a "typhoid condition" developed; tongue dry, cracked, and heavily coated with dark fur; delirium at times acute; picking at bed clothes; "jerking" of the tendons and involuntary evacuation of fæces. He remained in this state for four days, and some bronchial congestion with a dry cough developed. On July 21 he was transferred to the military hospital at Copenhagen, where he was still confined to bed on September 20.

The other cases suffered from general weakness, pain in limbs, loss of appetite, and a temperature ranging from 100° in the morning to 103° in the evening for weeks. Quinine was tried in all doses in powder, solution, and pill, and discarded as useless. Fowler's solution and Warburg's tincture were tried without much apparent good resulting. The dilute mineral acids to check the copious sweating and salol and phenacetine were more efficacious.

U. S. S. MARION.

(Note.)

D. O. LEWIS, *Surgeon.*

Cerebral hæmorrhage.—An ordinary seaman, aged 36 years, was on the poop firing with a revolver at target practice on December 21. He had fired three shots, when he suddenly fell and in five minutes expired. The necropsy revealed much congestion of the right side of brain and an effusion of blood which seemed to have come from the lateral sinus. The piamater was strewn in several places with a minute miliary deposit. He had apparently always enjoyed good health, had been in the service about two years, and had not been on liberty for three months.

U. S. S. OLYMPIA.

(Note.)

J. G. AYERS, *Medical Inspector.*

Amputation at knee.—An ensign, aged 24, while engaged as officer of the forecastle while anchoring the ship, on the afternoon of April 28, was struck about the middle of the right leg by the anchor chain. A shackle broke, and as the chain went over the side of the ship he was struck by the end. Both bones were comminuted and the soft parts were contused and lacerated into a pulpy mass from about the junction of the upper and middle thirds to a point near the ankle, the foot being nearly detached. The fibula was fractured about 2½ inches from the kneejoint and considerably higher than the tibia and both bones were shattered into many pieces, some entirely detached. The hæmorrhage was severe but quickly controlled by a medical officer standing near, who applied an improvised tourniquet. Amputation at the knee joint was performed by Stephen Smith's method with full antiseptic precautions. Five days after operation the pulse had not been over 86 or the temperature above 101.4°. The catheter had been used once and morphia administered in small doses as required. On May 2 he was transferred to the naval hospital at Mare Island, the original dressing not having been removed. He ultimately made a good recovery.

Aphasia.—An acting boatswain, aged 33 years, while on shore at San Francisco on June 18, and waiting on a wharf for a boat in which to return to the ship, fell backward on to a float some 6 or 8 feet below, striking his back and occiput. He was unconscious for some minutes and was taken to the Emergency Hospital, where he remained in a considerable degree of stupor until evening. He then returned to the ship with mental faculties seemingly restored. At the time of the accident he had been plied with liquor by the bystanders. He slept fairly well, but when he awoke in the morning ataxic aphasia had appeared. By noon this condition was very marked. He was transferred to Mare Island Hospital, where, under applications of ice to the head and the administration of cathartics and bromides, he finally improved sufficiently to be discharged to duty on July 23.

When he was admitted to the hospital he was able to walk with some assistance. There were no signs at any time of hemiplegia. The pupils were moderately dilated and responded normally to light. There was a tendency to somnolence, which lasted several days. Temperature was slightly elevated on June 21 and 22. At times there was some slight headache over left temporal region. No injury to the skull could be made out at any time.

U. S. S. PETREL.

(*Note.*)

W. F. ARNOLD, *Passed Assistant Surgeon.*

Acaro-dermatitis.—This affection appeared in the groin, and was spread thence by a sponge bath to all the joint flexures and to the armpits. The time required for development in a new locality was less than forty-eight hours. It bore no resemblance in its clinical appearance to any commonly described form of parasitic skin trouble. It may be best described as local patches of an intense, papillary, erythematous dermatitis. Adjacent to the more actively inflamed areas many punctate brownish spots, slightly raised, hard, and crust-like, appeared on the fourth day. Before resorting to treatment a piece of skin well into the subcutaneous fat was removed with curved scissors. A section of this showed an active inflammatory exudation into the deep layers of the rete and about all vascular structures. Even the smallest blood vessels were distended, and they were everywhere, even in the subcutaneous tissue, surrounded by inflammatory corpuscles. The corneous layer was absent in a few patches, its place being supplied by proliferating cells of the corium. In several points, immediately above foci showing very great inflammation, it contained in its substance small bodies whose exact nature could not be determined, but which were considered animal parasites. The use of various methods of staining neither proved their nature nor indicated the presence of any pathogenic microbe or fungus. The distribution, course, morbid anatomy, and response to antiparasitic treatment (chrysarobin ointment) were considered to indicate without completely proving that the nature of the disease was an infection of animal origin, presumably of the class Acaridæ. One other case was observed at Neuchang, China, during the winter, and, as in this one, its sequel was a large crop of most obstinate boils.

U. S. S. PINTA.

(*Note.*)

S. G. EVANS, *Passed Assistant Surgeon.*

Minor amputation.—A coxswain, 33 years old, had lost a portion of fourth finger as the result of a gunshot wound received prior to enlistment. As the stump gave trouble and was an incumbrance the entire finger was removed. He was returned to duty on the nineteenth day.

U. S. S. RANGER.

(Note.)

G. TUCKER SMITH, *Passed Assistant Surgeon.*

Thermic prostration.—On the morning of May 12, when the ship was bound for Panama from Buenaventura, Colombia, a fireman, aged 26, was prostrated by heat in the fireroom, where the temperature was 150° F. He was perfectly conscious and the pupils and sensation were normal. The muscles of the extremities were thrown into violent tonic spasms every three or four minutes, which would last about the same time. These spasms were all localized, affecting different groups of muscles at a time, and were associated with severe pain. The muscles of the trunk, head, and neck were unaffected. The pulse was 136 at first and there were intense nausea and vomiting. His temperature was 99° and never rose over 101° F. The patient stated that he had had similar attacks but none so severe. Insomnia and constant thirst were features of the case. Morphia gave only slight relief, lessening somewhat the violence of the spasms. Stimulants had very little effect upon the heart, and he died at 3.30 a. m., May 14, sixty-two hours after seizure. A necropsy was impracticable.

U. S. S. YORKTOWN.

(Note.)

G. P. LUMSDEN, *Surgeon.*

Cholera morbus?—A sergeant of marines was admitted about 9 a. m. of August 25, at sea, the day after leaving Shanghai. He had had diarrhœa since midnight and soon after admission began to vomit. There was a great deal of motion on the ship, on account of the sea. Soon after noon he showed symptoms of collapse, from which he gradually recovered. His pulse was very weak, extremities cold and clammy, and eyes sunken, and there were muscular cramps and a subnormal temperature (96°) for several days, accompanied by suppression of urine, one drachm of albuminous urine being drawn off by catheter on August 27. The temperature returned to the normal on the 29th, and then a period of fever (100° to 102.4°) followed until September 3. He was considered convalescent on September 5, and was discharged to duty on September 14. The treatment consisted of cracked ice, brandy, opium, sinapisms, spirits of niter, heat, and tonics. The patient had not been on shore for about a month, but there were cases of cholera at Shanghai. Isolation of the patient was enforced and his clothing and bedding disinfected. No other case occurred.

Hepatitis suppurativa?—A Chinaman, aged 42, was admitted October 4 with fever (100° to 102.3°), furred tongue, and constipation. His condition became hectic, temperature 103° to 105°, and then subnormal following profuse sweating at night. On October 30, a small pulsating tumor was discovered below sternum near left cartilages. The tumor enlarged, softened, and lost its pulsating character. An exploratory puncture with hypodermic needle demonstrated pus, which was evacuated by aspiration. Four ounces of very offensive bile-stained pus were obtained on the morning of November 3. His death occurred the following night. A necropsy was impracticable on account of his nationality.

SHORE STATIONS.

NAVY-YARD, WASHINGTON, D. C.

(*Note.*)

JOHN C. WISE, *Medical Inspector.*

Malarial fevers.—Malarial fevers prevailed during the third quarter of the year, attacking all the seamen and 80 per cent of the marines. The intensity and prevalence of this trouble is indisputably due to the condition of the Anacostia River. In 1892 the channel on which the yard fronts was deepened and the mud thrown on the adjacent flats. Mud bars were also placed so as to interrupt the usual tidal currents. This has resulted in a large increase of soil exposed to solar action in summer, decomposition doubtless proceeding even at high water in very hot weather. The type of fever has been severe, principally remittent and intermittent, running into the former type. Patients recovering show marked tendency to cachexia and the signs of extreme spoliation of the blood.

NAVAL ACADEMY.

(*Note.*)

T. C. WALTON, *Medical Director.*

Operation for perforative appendicitis.—A naval cadet, aged 18, after exercising on November 25, was chilled and had fever. He was apparently well on the next day and resumed his duties. On November 29 he complained of colicky pains. Pain located in lower right abdominal quadrant persisted. It was associated with nausea, vomiting, temperature of 102.8° to 103.8°, pulse 94, respiration 24, increased tension of right half of abdomen, and acute tenderness at the McBurney point. A probable diagnosis of appendicitis was made, and large enemata, continuous application of ice bag, and an occasional dose of morphia were employed. The symptoms did not diminish, and on the tenth day, though there was inconclusive evidence of pus formation, an operation was performed. The abscess behind and to the outer side of cæcum was opened and a quantity of foul pus discharged with a perforated detached appendix. The cavity was irrigated, dusted with iodoform, and lightly packed with iodoform gauze. At a subsequent dressing an enterolith appeared. Preceding, and for three days following, the operation the patient's condition was critical, as there were great prostration, recurring hiccough, anorexia, epistaxis, jaundiced complexion, petechial eruption, and other evidences of a marked septicæmia. The condition slowly improved and passed into recovery.

HOSPITALS.

NAVAL HOSPITAL, CHELSEA.

(*Note.*)

J. H. CLARK, *Medical Director.*

Venenum neuroticum.—A landsman, aged 31, was admitted to hospital March 26 as with catarrhus epidemicus. He had a left pleurisy with effusion; cough, pain, and fever were slight. His case progressed favorably though he was slow in regaining strength and was troubled with obstinate constipation. On May 17 a tumor appeared on the left hip below the greater trochanter. This was considered an inflamed bursa. It disappeared in a week under appropriate treatment. He however remained weak and nervous and troubled with constipation, though he was improving under small doses of Epsom salts and tonic treatment. On June 23 signs of lead poisoning became quite prominent. Colicky pains, inflamed and tender gums, weakness of the muscles of forearm with tremor, general weakness, and persistent constipation. The use of Epsom salts was continued as required and iodide of potassium exhibited. Under this treatment he improved steadily, the tremors disappearing and strength increasing. Weakness and tremor were last apparent in right forearm. They disappeared under electric treatment and he was discharged to duty after living in hospital one hundred and thirty-nine days. The opinion was expressed that the origin was prior to his enlistment on January 15, 1895.

Fractura.—A seaman, aged 23, was admitted April 15, as with fractura. His history showed that five days before, while on duty in a steam launch, the boat was moved suddenly at the time the heaving line happened to be twisted about the fingers of his left hand. The result was a compound fracture of middle finger and a lacerated wound of ring finger, the wound in the former extending across the palmar surface of middle joint, and that in the latter being insignificant. Antiseptic dressings and support in a sling were maintained until the 18th, when it was apparent that the tip of middle finger was becoming gangrenous. The back of hand was considerably swollen and the pain severe. Under ether, and with antiseptic precautions, a compound fracture of middle phalanx of left third finger was disclosed and suppuration of soft parts up to metacarpal joint. Two phalanges were removed by disarticulation. Puffiness on hand continuing, stump suppurating, and a painful point developing on palmar surface near metacarpal articulation, on May 29, under cocaine, a sinus in remaining phalanx was slit, condyle of phalanx exposed, superficial necrosis removed, and an opening secured in palm. Under iodoform dressing and drainage the case then progressed favorably and was discharged well, on July 17.

Urethræ strictura.—A private marine, aged 52 years, was admitted January 14, with stricture of the urethra. He gave a history of several attacks of gonorrhœa, one lasting an entire year, and declared the existence of a stricture for fifteen years, for which he had been treated by gradual dilatation as late as the previous spring. Urine was subnormal in quantity, at times turbid with pus, and often passed with difficulty, sometimes coming away only in drops, and at others in a fair stream. But after micturition the passage of a catheter obtained no residual urine. A steel sound, No. 9 E, was passed, and in about two weeks the strictures were dilated up to 14 E. He improved somewhat under tonics and buchu, but the urine still containing pus, the bladder was washed out from time to time with solution of nitrate of silver, which caused considerable improvement. On March 8, after application of cocaine, meatus was slit and three strictures divided with Otis' dilating urethrotome. They were situated 2, 3, and 3½ inches from meatus, and were cut to admit 32 F. Though morphine and pilocarpine were given after operation, he had two rigors in the evening, one lasting fifteen and the other ten minutes, followed by temperature of 102° F. Quinine and phenacetin internally, and solution of corrosive sublimate 1-60000 as an injection, caused disappearance of constitutional symptoms. On March 12 he was allowed to sit up, after which date the passage of sounds (No. 18 E) caused no general symptoms whatever. A mild astringent injection was used until March 30, and on April 8 he was discharged to duty.

NAVAL HOSPITAL, BROOKLYN.

(*Note.*)

E. S. Bogert, *Medical Director.*

Mediterranean fever.—During the year there were under treatment 27 patients who came from the European station in the spring with the diagnosis of remittent fever. Careful observation extending over some weeks confirmed the opinion that they were suffering from Malta or Mediterranean fever, apparently not of malarial origin but due to a specific cause quite distinct from either the malarial plasmodium or the typhoid bacillus. The symptoms and severity of the disease varied greatly. The mild cases were scarcely confined to bed and the severe cases were greatly prostrated. In every case there was an elevation of temperature, 100° to 105° and over, with more or less weakness and malaise. The fever was of the most varied types, continuous, intermittent, or remittent. Relapses were of frequent occurrence. A patient would have a normal temperature, be up and around and apparently convalescent when there would be a recurrence of the fever and a return of the general weakness. As a rule the relapses were not as severe as the original attacks. Several of the patients suffered from rheumatic pains of considerable severity, in the joints and limbs, attended in some instances with inflammation of the affected parts. In no case was there much diarrhœa or other symptoms pointing to enteric complications.

Quinine, even in large doses (75 grains a day) appeared to have no curative effect, and the same was true of other drugs used. Tonics, nutritious diet, and stimulants gave the best results.

The majority slowly convalesced, a few remaining in hospital more than three months. There were no deaths, although a fatal termination was feared in several cases.

Concussio.—A fireman, aged 28, was admitted April 3 as with "asphyxia ex submersione," having been found early that morning lying at the bottom of the wooden dry dock in the New York yard, unconscious and covered with mud. There was a small deep cut on the left eyebrow, but apparently without fracture. When received he was unconscious but without paralysis of sensation or motion. Pupils were somewhat contracted, though equal and responsive to light. He could speak when aroused, but not answer rationally. He soon vomited a mixture of mud, water, and whisky, and became restless and then violent, requiring mechanical restraint. On the next day his excitement had subsided to a great extent, but consciousness did not fully return for nearly a week, although during that time, when aroused from his semicomatose condition, he took food eagerly. His bowels did not move for several days and then discharged some of the mud which he had swallowed. Urine was passed involuntarily. At the end of the week his mind became fairly clear, as the effects of the concussion diminished, and then it was found that the tactile sensibility of the left foot and hand was much impaired. He would also wet his bed during sleep, but when awake could control his bladder. Nearly three weeks after the injury, on trying to walk, he exhibited great loss of motion and sensation in left leg and arm. He could not stand alone without grasping a support, and dragged his legs. The vision was much affected and he was troubled with double vision, which led to the use of one eye. Two months after admission he was regaining considerable power in the arm, while the leg was still much involved. When he looked down, he saw double; but when he looked up, the vision was normal. Under strychnine and electricity he continued to improve, vision became normal, paralysis of arm disappeared, and he was discharged, enlistment expired, after one hundred and sixty-eight days' treatment, still with slight impairment of motion of left leg.

NAVAL HOSPITAL, PHILADELPHIA.

(*Note.*)

D. KINDLEBERGER, *Medical Director.*

Aneurysma.—A private marine was admitted June 1, 1895, as with syphilis consecutiva. He had previously been treated in hospital for specific periostitis. Condition on admission: Persistent pain referred to fifth dorsal vertebra, where there was also tenderness on pressure, pain was also referred to same point in deglutition which gave much trouble; aphonia and dyspnœa marked; upper part of left chest more prominent than right, the supra-clavicular depression being effaced; over part of left chest were a decided pulsation, slight impairment of resonance, and transmission of heart sounds, but no bruit; heart displaced toward left side. On July 26 he had a small hæmorrhage, coughing up about 4 ounces of bright liquid blood. On July 27 was suddenly seized with severe hæmorrhage, from which he died. *Necropsy.*—Left pleural cavity filled with serum; left lung congested; upper lobe solidified; pericardium nearly filled with serum; heart small and flabby; commencement of descending arch of aorta dilated; border of vertebra opposite corroded; stomach filled with blood; sac of aneurysm opened into trachea and œsophagus.

NAVAL HOSPITAL, WASHINGTON.

(*Note.*)

GEORGE A. BRIGHT, *Medical Inspector.*

Febris enterica.—A private marine, aged 27, was admitted in 1894 with a large abscess in left ischio-anal region. A few days afterwards an operation for fistula in ano was performed, and after sixty-five days he was returned to duty entirely healed. A few days later he was readmitted with a superficial abscess in the cicatrix. He had continued fever, temperature reaching 102° F. three days after admission when the diagnosis of typhoid fever was recorded. The fever lasted six weeks (until February 3, 1895), and then, after a week's interval, there was another period of pyrexia, associated with an offensive diarrhœa. On April 9 there were signs of intestinal perforation and this was followed by death in two days. The necropsy revealed fæcal extravasation into peritoneal cavity, extreme contraction of colon throughout its course, marked contraction at ileo-cœcal valve, old cicatrices in ileum with numerous ulcers, three perforations of ileum and two of colon. There was also cheesy degeneration of apices of both lungs and a small spleen. Mesenteric glands were enlarged and other organs were normal.

Aneurysma.—A carpenter's mate, aged 49 years, was admitted as with chronic bronchitis. Cardiac asthma became prominent and symptoms of compression from intra-thoracic tumor apparent. He died in an attack of syncope about four months after admission. Necropsy revealed a large fusiform aneurism of arch of aorta containing large partly organized clots, and associated with extensive adhesions to surrounding tissues. Heart was dilated and aortic valves incompetent. The lungs were about one-third normal size, being in a state of atrophic degeneration.

Prostatitis (*castration*).—A musician, aged 67 years, was admitted with epididymitis resulting from attempts to pass a catheter for retention of urine. There was a history of several such attacks and an enlarged prostate of five years standing. After the subsidence of the inflammation of the epididymis, the retention of urine persisted, and with difficulty a No. 8 catheter was introduced for his relief. Owing to frequent overdistention, the bladder was much atrophied and there was a marked cystitis without, it appeared, an extension of inflammation to the kidneys. As the general condition of the patient became steadily worse, castration was proposed and performed, both testicles being removed on November 1. The counterirritation resulting caused an immediate improvement, and by the fifth day one-half the urine was passed voluntarily. This was followed by a return to the old condition, so that by the tenth day no urine was passed save by catheter. Then a steady improvement began, and on the twenty-third day all the urine was voided voluntarily and without pain. At the end of the year his general condition was much improved, the cystitis had almost disappeared, and the urine continued to pass naturally.

NAVAL HOSPITAL, NORFOLK.

C. J. Cleborne, *Medical Director.*

Aneurysma.—A private marine, aged 29 years, was admitted October 28, having previously been under treatment for some months for syphilis, which he had acquired eight years before. The symptoms of his specific trouble during those months had been mainly confined to pains in the joints and muscles, but there had also been slight ulceration around head of penis and mucous patches in mouth. Associated with this condition were loss of flesh and strength, persistent cough and hoarseness, mild fever, and signs of consolidation of left apex. Under close inspection, it appeared that the trachea was pushed to the right, and that there was a slight prominence to the left of sternum near its junction with second and third ribs, associated with enlargement of superficial veins and tenderness on pressure. Left brachial and radial pulses were absent, while those on right side were constant but weak. Left carotid pulsation was much weakened. There were dullness over upper portion of left lung in front and absence of respiratory murmur, and fremitus. Heart sounds were distinct but rather feeble. No bruit could be heard, but between lower angles of scapulæ there was a blowing systolic murmur. As the disease progressed, paroxysmal attacks of dyspnœa and difficulty in swallowing appeared. The dyspnœa was at times very distressing and accompanied by stridor. It was during one of these attacks that death occurred on December 7.

The necropsy disclosed a very large aneurism, the sac very thin posteriorly and 1½ inch thick anteriorly, connecting by a small smooth opening with the anterior face of the arch of the aorta. This sac occupied the region of heart from fourth rib as seen from the front, and extending to the left upward and outward was adherent to the chest wall by firm adhesions and bounded above by the clavicle. To the right its limit was the normal boundary of the heart. Its inner surface was wavy but smooth, and filled with dark clots of blood. In the sac wall, consisting of organized fibrine, were found the upper portion of the left bronchus and the branches of the aorta, those going to the left side of the body being elongated and narrowed, the left subclavian being smaller than the radial artery. The organized clot was of the shape of the heart, but a little larger, and was below and behind the aneurism. The heart appeared normal. There were no other marked changes in the coat of the aorta. The left lung was adherent in upper portion to chest wall and to the above-mentioned sac or mass.

Pancreatitis.—On July 8 a private marine, aged 35 years, was admitted as with heart disease. On his enlistment record, dated August 1892, there was a note of mitral murmur. At that time he had been in the service ten years. On admission there was a loud blowing systolic murmur over apex, with cardiac pain, epigastric pain, marked tympanites, distention of superficial abdominal veins, marked ascites, œdema of ankles, and a feeling of choking when lying down. No albumen was found in urine. Three weeks after admission there was evidence of fluid in both pleural cavities, especially marked on left side, from which 500 gm. of reddish serum were drawn with consequent improvement in breathing. On August 3, 1,000 gm. of reddish serum were removed from peritoneal cavity. His general condition, however, steadily declined, and on August 8 he died of exhaustion. *Necropsy.*—Body much emaciated; abdomen and left pleural cavity contained large amounts of turbid fluid; left lung compressed. Fluid in small quantity in left pleura; peritoneum much congested; heart valves normal, but corpora aurantii much thickened; liver normal size; spleen small; apices of both lungs contained calcified masses of the size of hazelnuts, and the pleural surfaces corresponding to these nodes were adherent. A grayish-yellow opening led from duodenum into a gangrenous cavity in pancreas, the walls of which were softened, and by degrees passed into a reddish substance beyond which acini separated by thick connective tissue were plainly visible; the pancreas was supplied by large blood vessels, some of which were closed by firm coagula. The mass had undoubtedly compressed both aorta and vena cava.

Pleuritis purulenta.—An apprentice boy, aged 18 years, was admitted January 15 with pneumonia. On February 5, 10 ounces of pus were drawn from right pleural cavity, and on February 9 an incision was made over fifth rib from anterior to posterior axillary lines. One inch of the length of the bone was taken out, 15 ounces of pus removed, the cavity washed out with Thiersch's solution, and a drainage tube inserted. This was followed by marked change for the better in general condition. The dressing was removed daily and cavity washed out with boiled water. Drainage tube was omitted on March 22. Barring the complications of a severe left otitis media, the case progressed favorably and the patient was discharged to duty on April 29 well, and weighing 132 pounds.

NAVAL HOSPITAL, MARE ISLAND.

GEORGE W. WOODS, *Medical Director.*

Obstructio intestinalis.—An apothecary, aged 34 years, was admitted May 17 with history of frequent attacks of abdominal pain and colic, associated with chronic constipation. There was localized pain over caput coli. On the next day, as the result of a large enema and the administration of cathartics, he had two copious stools containing large quantities of hardened fæcal matter. The relief for the time was complete, all symptoms disappearing. The treatment for several days was then directed toward the breaking of the morphine habit, which, it seems, had existed for some years. This was fairly successful. On June 1 he complained of pain in the left iliac region, extending at times toward left nipple, and of loss of sleep as a consequence. Constipation was a marked feature throughout this case, the enema being constantly required and being only occasionally successful. On June 11 the signs of intestinal obstruction became marked, the abdomen becoming distended and tympanitic, stomach irritable, hiccough occasional, and pains severe at times, generally in left iliac region. His condition not yielding to medical treatment, on June 13 the abdomen was opened and no seat of stricture being found an artificial anus was formed from which a large amount of liquid fæcal matter was discharged. Death, however, occurred in a short time. The necropsy disclosed a distention of all the intestines to the beginning of the descending colon, all below being empty. At the point where the transverse became the descending colon, the intestine was adherent to the diaphragm and projected a little into the thoracic cavity, the flexion and adhesion almost obliterating the caliber. An abscess on the erector spinæ on the left side had completely disintegrated that muscle. The left lung was adherent to the chest wall throughout its entire extent and contained a number of small cavities. The right lung was adherent in its upper portion. A scar on left side of chest, corresponding to the opening in the diaphragm, showed that a stab wound had been the original cause of the adhesion.

STATISTICAL TABLES.

The following statistical tables give in detail the data on which the statements of this report are based:

I. General view of the effects of disease and injury on the Navy and Marine Corps during the year 1895.

II. *North Atlantic Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick-days, daily average of patients, deaths, transfers to hospital, and discharges from service during the year 1895.

III. *Pacific Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick-days, daily average of patients, deaths, transfers to hospital, and discharges from service during the year 1895.

IV. *South Atlantic Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick-days, daily average of patients, deaths, transfers to hospital, and discharges from service during the year 1895.

European Station.—Names of ships, average complements corrected for time, admissions for disease and injury, sick-days, daily average of patients, deaths, transfers to hospital, and discharges from service during the year 1895.

VI. *Asiatic Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick-days, daily average of patients, deaths, transfers to hospital, and discharges from service during the year 1895.

VII. *Receiving ships and other stationary vessels.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick-days, daily average of patients, deaths, transfers to hospital, and discharges from service during the year 1895.

VIII. *Navy-yards, marine barracks, and other shore stations.*—Names, average complements, admissions for disease and injury, daily average of patients, transfers to hospital, discharges from service, and deaths during the year 1895.

IX. *Force afloat.*—General aggregate, 1895.

X. *Force afloat.*—Detailed statement, 1895.

XI. *Navy-yards and other shore stations.*—General aggregate, 1895.

XII. *Navy-yards and other shore stations.*—Detailed statement, 1895.

XIII. *Naval hospitals.*—General aggregate, 1895.

XIV. *Naval hospitals.*—Detailed statement, 1895.

XV. Report of vaccinations.

XVI. Prevalence of special diseases (relation by scale).

XVII. Mortuary record.

XVIII. Deaths in the Navy and Marine Corps (relation by scale).

TABLE I.—*General view of the effects of disease and injury on the Navy and Marine Corps during the year 1895.*

Average strength	[a]13, 191
Average strength shown by reports of medical department	[b]12, 671
Admissions for disease	8, 530
Ratio per 1,000 of strength	673. 19
Admissions for injury	2, 095
Ratio per 1,000 of strength	165. 34
Total admissions to sick list during year	10, 625
Ratio per 1,000 of strength	838. 53
Daily average of patients	434. 23
Ratio per 1,000 of strength	34. 27
Total number of sick days	158. 495
Average for each man of Navy and Marine Corps	12. 51
Average days each case was treated	14. 92
Discharges from service for disease	176
Ratio per 1,000 of strength	13. 34
Discharges from service for injury	30
Ratio per 1,000 of strength	2. 27
Total discharges for disability	206
Ratio per 1,000 of strength	15. 61
Deaths from disease	70
Ratio per 1,000 of strength	5. 31
Deaths from injury (including poison)	20
Ratio per 1,000 of strength	1. 51
Total deaths from all causes	90
Ratio per 1,000 of strength	6. 82

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[a] Used in computing ratios of deaths and discharges from service for disability.

[b] Used in computing all ratios except those of deaths and discharges from service for disability.

TABLE II.—*North Atlantic Station.—Names of ships, average complements corrected for time, admissions for disease and injury, sick-days, daily average of patients, deaths, transfers to hospital, and discharges from the service on each ship during the year 1895.*

Names of ships.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transfered to hospital.	Number invalided from service.			Number of deaths.		
			Disease.	Injury.	Total.						From ship.	From hospital.	Total.	Afloat.	In hospital.	Total.
Alliance *a*	347 days	156	117	40	157	1, 006. 41	1, 071	3. 09	18. 84	11	1	1	2	...	1	1
Amphitrite *a*	253 days	117	147	40	187	1, 598. 29	1, 013	4. 00	23. 67	20	...	2	2	...	...	...
Atlanta *b*	272 days	210	126	33	159	757. 14	1, 246	4. 58	16. 24	12	...	4	4	...	...	...
Bache	Year	42	17	1	18	428. 57	228	. 62	14. 76	4	...	...	...	...	...	...
Bancroft *c*	69 days	17	6	2	8	470. 59	48	. 70	7. 78	....	...	...	...	...	...	...
Blake	Year	38	20	4	24	631. 58	92	. 25	6. 58	2	...	...	...	...	...	...
Cincinnati	Year	303	180	38	218	719. 47	1, 930	5. 29	17. 44	29	...	1	1	...	1	1
Columbia	Year	442	542	112	654	1, 479. 64	3, 351	9. 18	20. 77	131	1	14	15	...	3	3
Dolphin	Year	112	104	26	130	1, 160. 71	586	1. 60	14. 29	16	1	1	2	1	...	1
Essex	Year	190	188	52	240	1, 263. 15	1, 484	4. 07	21. 40	3	2	3	5	1	1	2
Fern	Year	42	29	3	32	761. 90	155	. 42	10. 09	11	...	...	...	...	...	...
Fish Hawk	Year	40	13	3	16	400. 00	110	. 30	7. 53	....	...	...	...	...	...	...
Indiana *a*	42 days	49	65	14	79	1, 612. 25	473	11. 26	26. 43	24	...	1	1	...	...	...
Lancaster *a*	111 days	80	49	12	61	762. 50	230	2. 07	7. 88	4	2	...	2	...	1	1
Maine *a*	106 days	108	59	26	85	787. 04	664	6. 26	16. 83	7	...	...	...	...	1	1
Minneapolis	Year	444	374	82	456	1, 027. 03	3, 639	9. 97	22. 45	11	2	4	6	...	1	1
Monongahela *c*	110 days	89	30	16	46	516. 85	426	3. 86	13. 08	2	...	...	...	...	1	1
Montgomery	Year	232	169	37	206	887. 93	1, 513	4. 15	17. 87	30	1	3	4	...	...	..
New York	Year	531	387	125	512	964. 22	4, 173	11. 43	21. 53	46	1	9	10	1	...	1
Portsmouth *b*	17 days	5	4	....	4	800. 00	18	1. 06	9. 64	3	...	1	1	...	...	...
Raleigh	Year	295	154	42	196	664. 41	1, 569	4. 30	14. 57	26	2	2	4	2	1	3
Texas *a*	139 days	136	88	38	126	926. 47	787	5. 66	15. 85	8	1	1	2	...	...	...
Vesuvius *b*	115 days	20	26	10	36	1, 800. 00	165	1. 43	22. 41	5	...	2	2	...	...	...

a Commissioned. *b* Out of commission. *c* Commissioned and out of commission.

TABLE III.—*Pacific Station.—Names of ships, average complements corrected for time, admissions for disease and injury, sick-days, daily average of patients, deaths, transfers to hospital, and discharges from the service on each ship for the year 1895.*

Names of ships.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick-days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.			Number of deaths.		
			Disease.	Injury.	Total.						From ship.	From hospital.	Total.	Afloat.	In hospital.	Total.
Adams *a*	8 days	3	3	...	3	1,000.00	4	0.50	4.35	1	...	...	...	...	...	...
Albatross	Year	66	23	9	32	484.84	192	.53	8.03	10	...	...	...	...	...	...
Alert	Year	131	72	29	101	770.99	1,164	3.19	24.35	6	...	3	3	...	...	...
Bennington	Year	177	140	23	163	920.90	1,164	3.19	18.02	33	...	5	5	1	...	1
Boston *a*	44 days	35	16	11	27	771.43	130	2.95	10.17	5	...	...	...	...	...	...
Gedney	Year	31	12	2	14	451.61	54	.15	4.84	2	...	...	...	...	...	...
Hassler *b*	132 days	12	7	...	7	583.33	22	.17	5.12	...	...	...	...	...	...	...
Marion *a*	105 days	55	31	17	48	872.72	282	2.69	14.16	5	...	1	1	1	...	1
Mohican *b*	259 days	128	79	18	97	757.81	520	2.01	11.10	11	...	5	5	...	...	...
Monterey	Year	178	120	41	161	904.49	1,647	4.51	25.34	20	...	2	2	...	...	...
McArthur	Year	28	15	1	16	571.43	116	.32	11.43	2	...	...	...	...	...	...
Olympia *a*	330 days	361	241	77	318	880.89	1,885	5.71	11.78	43	...	6	6	2	...	2
Patterson	Year	52	24	3	27	519.23	201	.55	10.58	1	...	...	...	...	...	...
Philadelphia	Year	379	138	71	209	551.45	1,673	4.58	12.08	14	...	8	8	1	...	1
Pinta	Year	90	34	25	59	655.56	887	2.43	27.00	...	1	1	2	...	...	...
Ranger *b*	357 days	125	87	21	108	864.00	719	2.01	15.70	8	...	3	3	1	...	1
Thetis	Year	101	56	19	75	742.57	552	1.51	14.95	10	...	2	2	1	...	1

a Commissioned. *b* Out of commission.

TABLE IV.—*South Atlantic Station.—Names of ships, average complements, admissions for disease and injury, sick-days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1895.*

Names of ships.	Periods in commission.	Average complements.	Admissions.			Admission rate per 1,000 of strength.	Number of sick-days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.			Number of deaths.		
			Disease.	Injury.	Total.						From ship.	From hospital.	Total.	Afloat.	In hospital.	Total.
Castine	Year	147	61	17	78	530. 61	1, 183	3. 24	22. 05	8	3	1	4	...	...	...
Newark	Year	336	327	57	384	1, 142. 86	3, 349	9. 18	27. 31	3	1	2	3	1	1	2
Yantic	Year	128	84	21	105	820. 31	998	2. 73	21. 36	1	1	1	2	...	...	...

TABLE V.—*European Station.—Names of ships, average complements corrected for time, admissions for disease and injury, sick-days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1895.*

Names of ships.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick-days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.			Number of deaths.		
			Disease.	Injury.	Total.						From ship.	From hospital.	Total.	Afloat.	In hospital.	Total.
Chicago *a*	121 days	137	113	12	125	912, 41	1, 176	9. 72	23. 54	23	1	3	4	1	1	2
Marblehead	Year	224	198	40	238	1, 062. 50	2, 339	6. 41	28. 61	23	...	1	1	1	2	3
San Francisco	Year	381	207	47	254	666. 67	2, 764	7. 57	19. 87	8	...	1	1	2	...	2

a Out of commission.

TABLE VI.—*Asiatic Station.—Names of ships, average complements, admissions for disease and injury, sick-days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1895.*

Names of ships.	Periods in commission.	Average complements.	Admissions.			Admission rate per 1,000 of strength.	Number of sick-days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.			Number of deaths.		
			Disease.	Injury.	Total.						From ship.	From hospital.	Total.	Afloat.	In hospital.	Total.
Baltimore	Year	345	104	53	157	455.07	2,612	7.16	20.75	22	2	2	4	2	...	2
Charleston	Year	288	244	58	302	1,048.61	2,602	7.13	24.75	11	...	1	1	...	...	...
Concord	Year	179	153	34	187	1,044.69	1.280	3.51	19.61	5	...	...	...	1	...	1
Detroit	Year	238	174	22	196	823.53	2,616	7.17	30.12	....	...	2	2	2	...	2
Machias	Year	148	112	16	128	864.86	1,506	4.13	27.88	8	...	2	2	3	...	3
Monocacy	Year	162	101	28	129	796.30	1,057	2.90	17.90	1	...	...	...	1	...	1
Petrel	Year	131	61	19	80	610.68	531	1.45	11.10	5	...	1	1	...	...	...
Yorktown	Year	178	101	20	121	679.78	918	2.52	14.13	3	...	1	1	1	...	1

TABLE VII.—*Receiving ships and other stationary vessels.—Names of ships, average complements corrected for time, admissions for disease and injury, sick-days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1895.*

Names of ships.*a*	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.			Number of deaths.		
			Disease.	Injury.	Total.						From ship.	From hospital.	Total.	Afloat.	In hospital.	Total.
Wabash	Year	165	57	10	67	406.06	447	1.22	7.33	12	...	...	...	1	1	2
Vermont	Year	502	289	69	358	713.15	2,245	6.15	12.25	73	4	5	9	4	1	5
Richmond	Year	105	50	9	59	561.90	240	.66	6.26	22	4	1	5	...	...	...
Franklin	Year	156	53	8	61	391.03	376	1.03	6.60	15	...	2	2	1	1	2
Independence	Year	220	116	40	156	709.09	1,009	2.76	12.56	18	1	1	2	3	3	6
Minnesota*b*	281 days	86	79	9	88	1,023.25	878	3.13	27.66	6	1	...	1	...	...	...
Ajax and monitors.*b*	220 days	43	8	1	9	209.30	220	1.00	13.89	1	...	...	...	1	.	1

a Constellation included in Newport Station, Table VIII. *b* Out of commission.

TABLE VIII.—*Navy-yards, marine barracks, and other shore stations.—Names, average complements, admissions for disease and injury, daily average of patients, transfers to hospital, discharges from the service, and deaths during the year 1895.*

Names.	Periods.	Average complements.	Admissions.			Admission rate per 1,000 of strength.	Number of sick-days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.			Number of deaths.		
			Disease.	Injury.	Total.						From station.	From hospital.	Total.	At station.	In hospital.	Total.
Yards and marine barracks:																
Portsmouth ...	Year	135	83	37	120	888.89	680	1.86	13.78	36	1	2	3	1	2	3
Boston..........	Year	186	111	26	137	736.56	615	1.68	9.04	41	3	2	5	1	1	2
New York......	Year	269	173	47	220	817.84	1,830	5.01	18.64	31	3	3	6	...	...	...
Philadelphia...	Year	122	46	9	55	450.82	231	.63	5.19	20	...	2	2	...	1	1
Washington ...	Year	165	224	26	250	1,515.15	1,021	2.80	16.95	79	1	3	4	...	3	3
Norfolk.........	Year	97	84	22	106	1,092.78	392	1.07	11.07	39	1	1	2	1	...	1
Pensacola	Year	15	3	1	4	266.67	53	.15	9.67	....	...	...	...	...	...	...
Mare Island ..	Year	192	110	45	155	807.29	977	2.68	13.94	16	...	6	6	1	3	4
Marine headquarters.	Year	156	103	4	107	685.90	777	2.13	13.64	31	...	2	2	...	1	1
Naval Academy	Year	428	301	61	362	845.79	2,055	5.63	13.15	1	...	1	1	2	...	2
Station at—																
Newport *a*	Year	416	351	66	417	1,002.40	3,201	8.77	21.08	11	12	7	19	6	2	8
New London...	Year	9	8	....	8	888.89	46	.13	14.00	....	...	...	...	...	...	...
Port Royal.....	Year	35	21	5	26	742.83	202	.55	15.81	2	...	...	...	...	1	1
Indian Head...	Year	6	5	1	6	1,000.00	18	.05	8.17	...	...	...	...	...	...	...
Port Orchard ..	Year	3	....	....	....	....	......	......	......	....	...	...	...	...	...	...
Key West	181 days ..	3	4	....	4	1,333.33	4	.02	3.68	....	...	...	...	...	...	...
Special duty at—																
Boston..........	Year	....	....	....	....	....	......	......	......	....	...	...	...	...	...	...
New York	Year	....	10	....	10	....	106	......	......	....	...	...	...	...	...	...
Philadelphia ..	Year	....	10	3	13	....	213	......	......	2	...	...	...	1	...	1
Norfolk........	Year	....	3	....	3	....	35	......	......	....	...	...	...	...	...	...
San Francisco .	Year	....	4	....	4	....	62	......	......	1	...	...	...	1	...	1
Washington ...	Year	....	38	4	42	....	843	......	......	3	...	5	5	1	...	1

a Includes Torpedo Station and U. S. T. S. *Constellation.*

TABLE IX.—*Force afloat—General aggregate, 1895.*

Classification of diseases.	Remaining from 1894.	Admitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to 1896.	Total number of sick-days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane.				
Class I.											
Parasites and parasitic diseases	1	22	18	5	....	....	......	....	....	......	108
Class II.											
General infectious diseases (non-venereal)	18	1, 570	1, 291	266	1	....	......	3	8	19	13, 650
Class III.											
Constitutional disorders of nutrition	3	34	21	13	2	....	......	....	....	1	236
Class IV.											
Diseases of the nervous system	9	670	589	65	11	2	3	....	2	7	3, 988
Class V.											
Diseases of the visual apparatus	3	96	81	15	1	....	......	....	....	2	984
Class VI.											
Diseases of the auditory apparatus	......	61	52	6	2	....	......	....	....	1	307
Class VII.											
Diseases of the olfactory apparatus	......	42	39	1	1	....	......	....	....	1	144
Class VIII.											
Diseases of the nutritive apparatus:											
Subsidiary class 1—Diseases of the digestive apparatus	29	1, 305	1, 263	43	....	....	......	1	5	22	5, 469
Subsidiary class 2—Diseases of the circulatory apparatus	2	68	40	24	1	2	......	....	2	1	942
Subsidiary class 3—Diseases of the respiratory apparatus	24	731	679	55	1	2	......	1	2	15	4, 517
Class IX.											
Diseases of the motory apparatus	4	363	325	31	1	....	......	1	....	9	2, 395
Class X.											
Diseases of the cutaneous apparatus	15	629	617	17	....	....	......	....	....	10	5, 160
Class XI.											
Venereal diseases and diseases of the genito-urinary apparatus	39	1, 095	871	213	2	....	......	....	3	45	14, 876
Class XII.											
Cysts and new growths	......	14	8	6	....	....	......	....	....	......	72
Class XIII.											
Injuries	30	1, 539	1, 435	79	7	....	......	....	13	35	13, 222
Class XIV.											
Extraneous bodies	......	4	4	......	....	....	......	....	....	......	8
Class XV.											
Poisons	1	183	173	6	....	....	......	....	2	3	710
Class XVI.											
Feigned diseases	......	4	4	......	....	....	......	....	....	......	7
Total	178	8, 430	7, 510	845	30	6	3	6	37	171	66, 795

TABLE X.—*Force afloat—Detailed statement, 1895.*

Diseases.	Remaining from 1894.	Admitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to 1896.	Total number of sick-days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS I.											
Parasites and parasitic diseases.											
Scabies	1	11	8	4							54
Tænia		9	9								51
Tinea trichophytina		1		1							0
Other diseases of this class		1	1								3
CLASS II.											
General infectious diseases (non-venereal).											
Cachexia malarialis		9	6	2						1	113
Catarrhus epidemicus		481	447	32				1		1	2,692
Cholera		2							2		14
Cholera morbus		49	46	1					1	1	150
Dysenteria acuta		16	12	2					1	1	125
Dysenteria chronica		1		1							6
Erysipelas		8	1	7							7
Febris enterica	1	17	3	15							267
Febris intermittens		286	269	15				1		1	1,422
Febris pneumonica	2	49	24	25					2		884
Febris remittens	4	299	233	67						3	3,330
Morbilli		21	1	20							38
Paralysis ascendens acuta		1		1							1
Parotitis epidemica		1	1								9
Rheumatismus articularis acutus	5	175	141	34						5	2,777
Rheumatismus articularis chronicus	2	50	25	21	1			1		4	710
Rubella		1		1							0
Scarlatina		3	2	1							53
Tuberculosis pneumonica acuta		4		2					2		103
Tuberculosis pneumonica chronica	2	17	1	17						1	275
Tuberculosis of other parts		2	1	1							135
Vaccina	2	77	77	1						1	498
Other diseases of this class		1	1								41
CLASS III.											
Constitutional disorders of nutrition.											
Anæmia	3	8	9	2							60
Debilitas senilis		6		4	2						37
Diabetes insipidus		1								1	41
Lithæmia		2	2								13
Pseudoleucocythæmia		1		1							1
Purpura simplex		1	1								21
Other diseases of this class		15	9	6							63
CLASS IV.											
Diseases of the nervous system.											
Apoplexia		3		2					1		1
Cephalalgia		52	51	1							158
Chorea		1	1								1
Dementia	1	11	3	5	3				1		86
Epilepsia	1	17	6	10	2						164
Febris continua simplex	3	139	134	6						2	754
Febris ephemera		95	94							1	324
Febris thermica		24	24								142
Hemicrania		2	2								2
Hemiplegia		3		3							11
Insomnia		1		1							12
Irritatio spinalis		1			1						17
Mania		7	1	5			1				110
Melancholia	3	14	1	13	1		2				477
Meningitis		1		1							63
Monoplegia		3	1	2							81
Myelitis		3		2	1						22
Nausea marina		56	54		2						180
Neuralgia	1	99	98	2							593

TABLE X.—*Force afloat—Detailed statement, 1895*—Continued.

Diseases.	Remaining from 1894.	Admitted.	Discharged to duty.	Invalided. To hospital.	Invalided. From service.	Invalided. On leave.	Invalided. To Government Hospital for Insane.	Deserted.	Died.	Continued to 1896.	Total number of sick-days.
CLASS IV—continued.											
Diseases of the nervous system—Con.											
Neurasthenia		19	13	3		1				2	163
Neuritis		1		1							2
Neuritis multiplex		1	1								2
Neurosis hysteroidea		4	3	1							18
Paranoia		1	1								39
Prostratio thermica		63	61	1					1		170
Sciatica		18	15	2						1	229
Sclerosis multiplex		1				1					3
Sclerosis spinalis posterior		1		1							64
Syncope		2	2								20
Vertigo		23	19	3	1						73
Other diseases of this class		4	4								7
CLASS V.											
Diseases of the visual apparatus.											
Amblyopia		2			1					1	27
Asthenopia		2	2								8
Astigmatismus		1		1							10
Blepharitis		2	2								3
Cataracta		1	1								21
Choroiditis		1		1							18
Conjunctivitis	1	50	47	3						1	276
Corneæ ulcus		4	3	1							63
Hordeolus	1	3	4								5
Iritis	1	18	17	2							318
Keratitis		6	3	3							119
Neuritis optica		1		1							9
Panophthalmitis		1		1							3
Retinitis		1		1							11
Trachoma		1	1								28
Other diseases of this class		2	1	1							65
CLASS VI.											
Diseases of the auditory apparatus.											
Myringitis		1	1								1
Otalgia		7	7								20
Otitis externa		26	26								123
Otitis media		23	16	6						1	145
Surditas		3	1		2						15
Other diseases of this class		1	1								3
CLASS VII.											
Diseases of the olfactory apparatus.											
Catarrhus æstivus		5	5								11
Rhinitis acuta		34	33							1	131
Rhinitis chronica		3	1	1	1						2
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.											
Subsidiary Class 1.—Diseases of the digestive apparatus.											
Adenitis salivosa		1	1								7
Ani prolapsio		2	2								19
Ani rhagades		2	2								6
Appendicitis		5	3	2							52
Catarrhus gastricus acutus	1	66	65	2							290
Catarrhus gastricus chronicus		2	1	1							7
Catarrhus intestinalis acutus	1	35	34							2	191
Catarrhus intestinalis chronicus		7	5							2	121
Cholelithiasis		9	6	3							55
Colica		149	144	2						3	390

TABLE X.—*Force afloat—Detailed statement, 1895*—Continued.

Diseases.	Remaining from 1894.	Admitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to 1896.	Total number of sick-days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS—continued.											
Subsidiary Class 1.—Diseases of the digestive apparatus—Continued.											
Constipatio	1	48	48							1	155
Dentis caries		7	7								41
Diarrhœa simplex	3	323	325							1	1, 026
Dyspepsia nervosa		12	11	1							75
Fistula in ano		9	1	7						1	95
Gastralgia		5	5								23
Glossitis		1	1								4
Hæmatemesis		1	1								27
Hæmorrhois	1	38	29	9						1	232
Hepatis congestio		18	18								100
Hepatitis suppurativa		1							1		30
Hypertrophia tonsillaris		1		1							0
Icterus		15	13	2							115
Obstructio intestinalis		3	1						2		17
Odontalgia		10	10								24
Parulis		1								1	1
Periodontitis		5	5								29
Peritonitis		2							2		2
Pharyngitis	6	120	125					1			507
Stomatitis		2	2								9
Tonsillitis	16	394	390	10						10	1, 662
Typhlitis		3	3								13
Ulcus gastricum		2		2							87
Uvula descendens		1	1								2
Other diseases of this class		5	4	1							55
Subsidiary Class 2.—Diseases of the circulatory apparatus.											
BLOOD VESSELS:											
Aneurysma		1		1							4
Angina pectoris		1		1							14
Cordis dilatatio		1		1							11
Cordis hypertrophia		3	3								6
Cordis palpitatio		16	7	9							124
Cordis valvularum morbus		15	3	8	1	1			2		130
Embolismus		1								1	38
Endocarditis		1		1							85
Varix		5	2	2		1					22
LYMPHATICS:											
Lymphadenitis	2	19	20	1							453
Lymphangitis		5	5								55
Subsidiary Class 3.—Diseases of the respiratory apparatus.											
Asthma		17	11	2	1	1			1	1	142
Bronchopneumonitis		5		4						1	24
Bronchitis acuta	8	200	191	12				1		4	1, 360
Bronchitis chronica	1	30	16	12		1			1	1	469
Catarrhus bronchialis	14	391	390	11						4	1, 739
Emphysema pulmonalis	1		1								19
Hæmoptysis		8	3	3						2	91
Laryngitis acuta		35	33	1						1	181
Laryngitis chronica		4	2	2							21
Pleuritis acuta		37	29	7						1	399
Pleuritis chronica		2	1	1							61
Pneumothorax		1	1								8
Other diseases of this class		1	1								3
CLASS IX.											
Diseases of the motory apparatus.											
Ankylosis		2	1	1							20
Arthritis		10	8	2							142
Arthritis deformans		1	1								9

TABLE X.—*Force afloat—Detailed statement, 1895*—Continued.

Diseases.	Remaining from 1894.	Admitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to 1896.	Total number of sick-days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS IX—continued.											
Diseases of motory apparatus—Cont'd											
Bursitis		3	3								47
Myalgia acuta	2	256	243	10				1		4	1,373
Myalgia chronica	2	47	38	10						1	399
Ostitis		3	1	2							48
Periostitis		2	2								24
Synovitis		27	18	5	1					3	267
Thecitis		11	9	1						1	64
Other diseases of this class		1	1								2
CLASS X.											
Diseases of the cutaneous apparatus.											
Abscessus	2	253	251	2						2	1,919
Acne	1	1	2								10
Carbunculus	1	9	8	1						1	83
Cellulitis		11	9	2							114
Clavus		5	3	2							25
Cutis fissuræ		5	5								19
Ecthyma		1	1								2
Eczema	1	23	21	3							308
Erythema		8	8								45
Furunculus	2	180	179							3	979
Herpes simplex		6	6								29
Herpes zoster	1	9	9							1	67
Impetigo		2	2								11
Lichen		1		1							0
Onychia		6	6								95
Paronychia	1	28	27	1						1	307
Pernio	1	2	3								28
Ulcus	5	55	55	4						1	922
Unguis involutus		8	6	1						1	137
Urticaria		13	13								32
Verruca		1	1								21
Other diseases of this class		2	2								7
CLASS XI.											
Venereal diseases and diseases of the genito-urinary apparatus.											
Adenitis inguinalis (venereal)	6	190	130	56						10	3,775
Arthritis gonorrhoica	1	25	18	8							615
Balanitis		18	13	4						1	90
Chancroid	1	140	123	13						5	2,126
Cystitis	1	13	10	4							217
Enuresis		3	2	1							8
Epididymitis	1	42	37	2						4	524
Fistula urinalis		3	1	2							25
Gonorrhœa	11	279	257	23						10	2,636
Hæmaturia		3	2	1							21
Hydrocele		2	1	1							11
Nephritis acuta		10	6	2					2		90
Nephritis chronica		3		2					1		67
Nephrolithiasis		3	3								17
Ophthalmia gonorrhoica		1	1								31
Orchitis	5	108	96	12						5	1,419
Paraphimosis	1	8	8	1							59
Phimosis		15	15								170
Prostatitis		1		1							5
Spermatorrhœa		2		1						1	1
Syphilis consecutiva	5	149	88	60	1					5	1,928
Syphilis primitiva	6	41	37	8						2	742
Urethræ strictura	1	26	14	11						2	180
Urethritis simplex		1	1								2
Urinæ retentio		2	2								9
Varicocele		2	1		1						15
Verruca acuminata		3	3								44
Other diseases of this class		2	2								49

TABLE X.—*Force afloat—Detailed statement, 1895*—Continued.

Diseases.	Remaining from 1894.	Admitted.	Discharged to duty.	Invalided. To hospital.	Invalided. From service.	Invalided. On leave.	Invalided. To Government Hospital for Insane.	Deserted.	Died.	Continued to 1896.	Total number of sick-days.
CLASS XII.											
Cysts and new growths.											
Adenoma		2	2								7
Cystis		3	3								13
Epithelioma		1		1							5
Fibroma		1	1								10
Lipoma		3	2	1							21
Sarcoma		4		4							16
CLASS XIII.											
Injuries.											
Abrasio		31	29							2	220
Ambustio ex calore	2	105	101	5						1	997
Ambustio ex frigore		4	4								22
Asphyxia		5	4						1		9
Asphyxia ex submersione		8		1					7		6
Concussio		10	7	2					1		41
Contusio	9	398	390	8	1					8	2,243
Deformitas		2	1		1						11
Fractura	4	73	48	22	1				1	5	1,882
Hernia	1	32	20	11	2						270
Luxatio	3	12	10	5							191
Membranæ tympani ruptio		3	3								18
Membri clades		1		1							1
Musculi ruptio		1	1								3
Sole excoctus		4	3	1							9
Stremma	5	329	323	8						3	2,607
Virium defectio		3	2		1						16
Vulnus contusum		152	149							3	1,189
Vulnus incisum	1	117	105	6					2	5	880
Vulnus laceratum	5	192	183	7						7	2,165
Vulnus punctum		45	43						1	1	257
Vulnus sclopeticum		10	8	2							170
Other diseases of this class		2	1		1						15
CLASS XIV.											
Extraneous bodies.											
Corpus extraneum		4	4								8
CLASS XV.											
Poisons.											
Alcoholismus	1	149	142	5					1	2	420
Dermatitis venenata		6	6								95
Venenum irritans		1							1		1
Venenum neuroticum		2	1	1							11
Vulnus venenatum		23	22							1	171
Other diseases of this class		2	2								12
CLASS XVI.											
Feigned diseases.											
Diarrhœa simplex		1	1								1
Melancholia		1	1								3
Myalgia acuta		1	1								2
Neuralgia		1	1								1
Total	178	8,430	7,510	845	30	6	3	6	37	171	66,795

TABLE XI.—*Navy-yards and other shore stations—General aggregate, 1895.*

Classification of diseases.	Remaining from 1894.	Admitted.	Discharged to duty.	Invalided. To hospital.	Invalided. From service.	Invalided. On leave.	Invalided. To Government Hospital for Insane.	Deserted.	Died.	Continued to 1896.	Total number of sick-days.
Class I.											
Parasites and parasitic diseases	......	7	4	2	....	....	......	1	....	......	104
Class II.											
General infectious diseases (non-venereal)	2	634	507	115	3	2	......	....	3	6	4,062
Class III.											
Constitutional disorders of nutrition	1	11	9	......	3	....	......	....	....	......	173
Class IV.											
Diseases of the nervous system	4	110	91	11	2	3	1	....	3	3	683
Class V.											
Diseases of the visual apparatus	3	29	31	......	....	....	......	....	....	1	288
Class VI.											
Diseases of the auditory apparatus	......	12	9	3	....	....	......	....	....	......	64
Class VII.											
Diseases of the olfactory apparatus	......	14	9	3	....	1	......	....	....	1	126
Class VIII.											
Diseases of the nutritive apparatus:											
Subsidiary class 1—											
Diseases of the digestive apparatus	4	350	325	24	....	....	......	....	1	4	1,584
Subsidiary class 2—											
Diseases of the circulatory apparatus	......	18	7	6	....	....	......	....	4	1	238
Subsidiary class 3—											
Diseases of the respiratory apparatus	2	161	141	19	2	....	......	....	....	1	997
Class IX.											
Diseases of the motory apparatus	2	55	53	3	1	....	......	....	....	......	302
Class X.											
Diseases of the cutaneous apparatus	3	138	124	13	2	....	......	....	....	2	988
Class XI.											
Venereal diseases and diseases of the genito-urinary apparatus	1	145	70	67	4	....	......	....	2	3	1,098
Class XII.											
Cysts and new growths	......	5	3	2	....	....	......	....	....	......	45
Class XIII.											
Injuries	8	319	283	31	3	....	......	....	2	8	2,423
Class XIV.											
Extraneous bodies	......	2	2	......	....	....	......	....	....	......	18
Class XV.											
Poisons	1	38	25	14	....	....	......	....	....	......	147
Class XVI.											
Feigned diseases	......	1	1	......	....	....	......	....	....	......	21
Total	31	2,049	1,694	313	20	6	1	1	15	30	13,361

TABLE XII.—*Navy-yards and other shore stations—Detailed statement, 1895.*

Diseases.	Remaining from 1894.	Admitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to 1896.	Total number of sick-days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS I.											
Parasites and parasitic diseases.											
Scabies		2		2							0
Tænia		2	2								5
Tinea favosa		2	2								69
Tinea trichophytina		1						1			30
CLASS II.											
General infectious diseases (nonvenereal).											
Cachexia malarialis		4	3	1							36
Catarrhus epidemicus	2	174	172	4							898
Cholera morbus		5	5								12
Dysenteria acuta		1	1								5
Erysipelas		5	2	3							13
Febris enterica		9	5	1		1			2		378
Febris intermittens		174	151	20						3	795
Febris pneumonica		8	7						1		156
Febris remittens		133	74	59							714
Morbilli		14	13	1							188
Rheumatismus articularis acutus		34	21	12						1	278
Rheumatismus articularis chronicus		15	9	6							114
Rubella		5	5								31
Tuberculosis pneumonica acuta		7		4	3						79
Tuberculosis pneumonica chronica		6	2	3		1					45
Vaccina		35	32	1						2	260
Varicella		5	5								60
CLASS III.											
Constitutional disorders of nutrition.											
Anæmia	1	5	4		2						62
Diabetes mellitus		2	2								57
Hæmophilia		1	1								2
Lithæmia		2	2								40
Other diseases of this class		1			1						12
CLASS IV.											
Diseases of the nervous system.											
Apoplexia		3							3		4
Cephalalgia		29	29								64
Dementia		1	1								79
Epilepsia		2	1		1						21
Febris continua simplex		13	10	3							41
Febris ephemera		12	12								34
Febris thermica		1	1								11
Hemiplegia	1	1	1	1							33
Insomnia		1		1							4
Irritatio spinalis		1		1							0
Mania		1		1							0
Melancholia		1					1				10
Neuralgia	3	19	21	1							106
Neurasthenia		4		1		2				1	14
Neurosis hysteroidea		1								1	2
Paraplegia		1	1								11
Prostratio thermica		4	4								34
Sciatica		5	4	1							54
Sclerosis lateralis spastica		1				1					18
Sclerosis multiplex		1								1	7
Sclerosis spinalis posterior		1	1								5
Vertigo		6	4	1	1						109
Other diseases of this class		1	1								22

TABLE XII.—*Navy-yards and other shore stations—Detailed statement, 1895*—Cont'd.

Diseases.	Remaining from 1894	Admitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to 1896.	Total number of sick-days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS V.											
Diseases of the visual apparatus.											
Asthenopia		1	1								4
Astigmatismus		3	3								63
Conjunctivitis	1	20	21								157
Corneæ ulcus		3	2							1	20
Keratitis		1	1								5
Myopia	1		1								11
Retinitis	1		1								11
Trachoma		1	1								17
CLASS VI.											
Diseases of the auditory apparatus.											
Myringitis		1	1								1
Otalgia		2	2								2
Otitis externa		4	4								35
Otitis media		5	2	3							26
CLASS VII.											
Diseases of the olfactory apparatus.											
Catarrhus æstivus		3	3								6
Rhinitis acuta		7	6							1	16
Rhinitis chronica		4		3		1					104
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.											
Subsidiary Class 1.—Diseases of the digestive apparatus.											
Appendicitis		5	2	1					1	1	81
Catarrhus gastricus acutus		7	7								25
Catarrhus gastricus chronicus		2	1	1							5
Catarrhus intestinalis acutus		23	23								65
Catarrhus intestinalis chronicus		4	2	2							9
Cholelithiasis		1		1							1
Colica	2	23	25								57
Constipatio		15	15								106
Dentis caries		3	3								6
Diarrhœa simplex		89	87	2							269
Dyspepsia nervosa		2	2								7
Fistula in ano		3		3							14
Gastralgia		3	3								3
Hæmorrhois		13	12	1							177
Hepatis congestio		7	7								54
Hepatitis acuta		1	1								26
Hepatitis chronica		2		2							25
Icterus		2	2								21
Odontalgia		10	10								15
Parulis		1		1							0
Peritonitis		1		1							1
Pharyngitis		30	28	2							74
Stomatitis		1	1								4
Tonsillitis	2	97	89	7						3	425
Typhlitis		2	2								18
Ulcus gastricum		2	2								93
Uvula descendens		1	1								3
Subsidiary Class 2.—Diseases of the circulatory apparatus.											
A—BLOOD VESSELS:											
Aneurysma		2		1					1		31
Arteriosclerosis		1	1								10
Cordis dilatatio		3	1	2							17
Cordis valvularum morbus		6	1	2					3		124
Varix		1	1								4
B—LYMPHATICS:											
Lymphadenitis		2	1							1	43
Lymphangitis		3	2	1							9

TABLE XII.—*Navy-yards and other shore stations—Detailed statement, 1895*—Cont'd.

Diseases.	Remaining from 1894.	Admitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to 1896.	Total number of sick-days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS—continued.											
Subsidiary Class 3.—Diseases of the respiratory apparatus.											
Asthma		3	1	1	1						32
Bronchopneumonitis		1	1								11
Bronchitis acuta	2	68	63	7							550
Bronchitis chronica		11	8	2	1						99
Catarrhus bronchialis		59	56	3							218
Hæmoptysis		3	1	2							21
Laryngitis acuta		8	8								31
Pleuritis acuta		7	3	3						1	35
Pleuritis chronica		1		1							0
CLASS IX.											
Diseases of the motory apparatus.											
Myalgia acuta		47	45	2							225
Myalgia chronica	1	3	3	1							44
Periostitis		1	1								4
Synovitis	1	3	3		1						19
Thecitis		1	1								10
CLASS X.											
Diseases of the cutaneous apparatus.											
Abscessus	2	41	38	5							198
Acne		2	1		1						18
Carbunculus		6	4	2							51
Cellulitis		2	2								20
Clavus		3	3								13
Eczema		8	4	3	1						108
Erythema		4	4								19
Furunculus		34	34								189
Herpes simplex		1	1								3
Herpes zoster		2	2								10
Lichen		1	1								5
Onychia		4	3							1	18
Paronychia		5	4	1							30
Pernio		1	1								2
Psoriasis		1	1								32
Ulcus	1	16	14	2						1	204
Unguis involutus		5	5								61
Urticaria		1	1								4
Other diseases of this class		1	1								3
CLASS XI.											
Venereal diseases and diseases of the genito-urinary apparatus.											
Adenitis inguinalis (venereal)		14	6	7						1	131
Arthritis gonorrhoica		2		1						1	37
Chancroid		12	5	7							114
Cystitis		6	4	2							76
Enuresis		5	3		2						27
Epididymitis		3	2	1							21
Fistula urinalis		2	2								29
Gonorrhœa		49	20	29							207
Hæmaturia		1	1								4
Nephritis acuta		1		1							11
Nephritis chronica		2							2		3
Nephrolithiasis		4	3							1	38
Orchitis		11	8	3							91
Phimosis		1	1								12
Prostatitis		1		1							0
Spermatorrhœa		1	1								5
Syphilis consecutiva	1	22	10	11	2						211
Syphilis primitiva		1	1								2
Urethræ strictura		3	1	2							2
Urinæ retentio		3	2	1							29
Other diseases of this class		1		1							48

TABLE XII.—*Navy-yards and other shore stations—Detailed statement, 1895*—Cont'd.

Diseases.	Remaining from 1894.	Admitted.	Discharged to duty.	Invalided. To hospital.	Invalided. From service.	Invalided. On leave.	Invalided. To Government Hospital for Insane.	Deserted.	Died.	Continued to 1896.	Total number of sick-days.
CLASS XII.											
Cysts and new growths.											
Cystis		3	3								10
Epithelioma		2		2							35
CLASS XIII.											
Injuries.											
Abrasio	1	9	10								49
Ambustio ex calore	1	11	11	1							103
Ambustio ex frigore		1	1								4
Asphyxia ex submersione		1							1		1
Concussio		5	5								13
Contusio	2	67	62	5	1					1	338
Fractura	3	22	12	10	1					2	553
Hernia		11	7	3	1						57
Luxatio		2	2								7
Musculi ruptio		1	1								12
Sole excoctus		3	2	1							39
Stremma		89	81	5						3	554
Vulnus contusum		32	32								240
Vulnus incisum	1	28	28	1							223
Vulnus laceratum		28	23	3						2	205
Vulnus punctum		6	6								24
Vulnus sclopeticum		3		2					1		1
CLASS XIV.											
Extraneous bodies.											
Corpus extraneum		2	2								18
CLASS XV.											
Poisons.											
Alcoholismus	1	34	21	14							110
Dermatitis venenata		2	2								21
Vulnus venenatum		2	2								16
CLASS XVI.											
Feigned diseases.											
Insanitas		1	1								21
Total	31	2,049	1,694	313	20	6	1	1	15	30	13,361

TABLE XIII.—*Naval hospitals—General aggregate, 1895.*

Classification of diseases.	Remaining from 1894.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to 1896.	Total number of sick-days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
Class I.												
Parasites and parasitic diseases	2	1	7	9	....	....	....	......	....	....	1	279
Class II.												
General infectious diseases (nonvenereal)	54	40	418	351	64	31	3	......	1	19	43	23, 029
Class III.												
Constitutional disorders of nutrition	6	1	12	14	1	1	....	......	....	....	3	1, 119
Class IV.												
Diseases of the nervous system	11	19	81	51	13	17	4	7	1	2	16	5, 962
Class V.												
Diseases of the visual apparatus	4	4	18	14	3	5	....	......	....	....	4	1, 685
Class VI.												
Diseases of the auditory apparatus	1	.....	10	8	1	....	....	......	....	....	2	546
Class VII.												
Diseases of the olfactory apparatus	.....	.....	4	4	....	....	...	......	....	....	.....	149
Class VIII.												
Diseases of the nutritive apparatus:												
Subsidiary class 1—Diseases of the digestive apparatus	15	8	70	69	3	4	2	......	3	1	11	3, 844
Subsidiary class 2—Diseases of the circulatory apparatus	7	11	37	21	7	9	1	......	2	8	7	2, 961
Subsidiary class 3—Diseases of the respiratory apparatus	11	6	72	55	10	7	1	......	1	3	12	3, 817
Class IX.												
Diseases of the motory apparatus	5	2	39	27	5	4	1	......	....	....	9	2, 126
Class X.												
Diseases of the cutaneous apparatus	12	3	32	37	2	2	....	......	....	....	6	1, 791
Class XI.												
Venereal diseases and diseases of the genito-urinary apparatus	84	36	324	297	51	20	1	1	7	2	65	23 674
Class XII.												
Cysts and new growths	1	.....	7	4	1	1	....	......	....	....	2	382
Class XIII.												
Injuries	20	8	111	92	11	17	3	......	....	2	14	6, 265
Class XV.												
Poisons	1	7	21	23	2	2	....	......	....	....	2	710
Total	234	146	1, 263	1, 076	174	120	16	8	15	37	197	78, 339

TABLE XIV.—*Naval hospitals—Detailed statement, 1895.*

Diseases.	Remaining from 1894.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to 1896.	Total number of sick-days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS I.												
Parasites and parasitic diseases.												
Scabies	2		6	7							1	228
Tinea trichophytina		1	1	2								51
CLASS II.												
General infectious diseases (nonvenereal).												
Cachexia malarialis	1	1	3	3			2					135
Catarrhus epidemicus		2	41	38	2	1				1	1	1,557
Cholera morbus			1	1								6
Dysenteria acuta			3	2	1							77
Dysenteria chronica	1	2	1	3		1						145
Erysipelas			9	9								329
Febris enterica	5	5	14	15			1			4	4	1,113
Febris intermittens	2	1	33	27	1	1					7	1,481
Febris pneumonica	5	6	20	18	2	1				7	3	1,290
Febris remittens	8	6	146	115	29	1				1	14	6,170
Morbilli		1	21	21							1	531
Rheumatismus articularis acutus	10	2	47	50	6	1				1	1	3,091
Rheumatismus articularis chronicus	9	3	34	24	8	7			1		6	2,215
Rubella			1	1								39
Scarlatina			2	2								66
Tuberculosis pneumonica acuta	2		9	3	1	3				2	2	985
Tuberculosis pneumonica chronica	10	9	31	15	13	15				3	4	3,742
Tuberculosis of other parts		1			1							4
Vaccina			2	2								12
Variola		1		1								41
Other diseases of this class	1			1								0
CLASS III.												
Constitutional disorders of nutrition.												
Anæmia	2		3	5								97
Debilitas senilis	1		4	2							3	459
Diabetes insipidus			1		1							8
Diabetes mellitus		1				1						21
Pseudoleucocythæmia			1	1								61
Other diseases of this class	3		3	6								473
CLASS IV.												
Diseases of the nervous system.												
Apoplexia	1	1	2	2						1	1	188
Aphasia			1	1								14
Cephalalgia	1		1	1							1	71
Dementia		4	6	3	2	2		2			1	454
Epilepsia		1	7	4	1	3						384
Febris continua simplex			8	5	1						2	171
Hemiplegia			6		1	1	1				3	389
Insomnia			2	1							1	123
Irritatio spinalis			1			1						291
Mania	1	2	6	3	3	2		1				339
Melancholia	1	2	12	5		4		4	1		1	674
Meningitis		1								1		1
Monoplegia	1	1	4	2	2	1					1	793
Myelitis	1		3	3		1						346
Neuralgia	1		4	5								184
Neurasthenia		1	4	2			2				1	84
Neuritis		2	2	2	1						1	149
Neuritis multiplex	1			1								64
Neurosis hysteroidea			1	1								39
Paraplegia		1				1						84
Prostratio thermica			1	1								2
Sciatica			3	2							1	376
Sclerosis lateralis spastica		2	1	1	1						1	198
Sclerosis spinalis posterior	1		1	2								40
Vertigo	1		5	3	1	1	1					199
Other diseases of this class	1	1		1							1	305

TABLE XIV.—*Naval hospitals—Detailed statement, 1895*—Continued.

Diseases.	Remaining from 1894.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to 1896.	Total number of sick-days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS V.												
Diseases of the visual apparatus.												
Astigmatismus			1			1						63
Cataracta	1		1	1	1							300
Choroiditis			1								1	1
Conjunctivitis		1	4	4	1							288
Corneæ ulcus	1		1	1		1						100
Iritis	1	1	2	4								130
Keratitis			3	1							2	54
Myopia			2	1	1							49
Neuritis optica		1	1			1					1	365
Obstructio lacrimalis		1		1								4
Panophthalmitis			1	1								4
Retinitis	1		1			2						327
CLASS VI.												
Diseases of the auditory apparatus.												
Otitis media			10	7	1						2	512
Surditas	1			1								34
CLASS VII.												
Diseases of the olfactory apparatus.												
Rhinitis chronica			4	4								149
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.												
Subsidiary class 1.—Diseases of the digestive apparatus.												
Ani prolapsio	1		1	2								59
Appendicitis		2	5	3			2				2	207
Catarrhus gastricus acutus			2	2								53
Catarrhus gastricus chronicus			2		1						1	36
Catarrhus intestinalis chronicus	1	2	2	3		1					1	303
Cholelithiasis			5	3							2	149
Colica			2	2								16
Constipatio		2		1							1	66
Diarrhœa simplex			2	1					1			17
Dyspepsia nervosa	1		2	3								173
Fistula in ano	3	1	10	12					1		1	854
Hæmorrhois	6		9	11		2					2	817
Hepatis congestio			1		1							42
Hepatitis chronica			2	1	1							166
Hypertrophia tonsillaris			1	1								42
Icterus			2	2								72
Obstructio intestinalis			1							1		28
Parulis			1	1								6
Peritonitis	1			1								174
Pharyngitis	1		2	3								26
Tonsillitis	1	1	16	16					1		1	441
Ulcus gastricum			2	1		1						97
Subsidiary class 2.—Diseases of the circulatory apparatus.												
BLOOD VESSELS:												
Aneurysma		3	2	1						3	1	76
Cordis dilatatio			1								1	1
Cordis palpitatio		2	14	7	2	3			1		3	746
Cordis valvularum morbus	5	4	14	7	4	4	1			5	2	1, 561
Phlebitis		1		1								71
Varix	1		2	1		2						144
LYMPHATICS:												
Lymphadenitis	1	1	4	4	1				1			362

TABLE XIV.—*Naval hospitals—Detailed statement, 1895.*—Continued.

Diseases.	Remaining from 1894.	Admitted.	Readmitted.	Discharged to duty.	Invalided. To hospital.	Invalided. From service.	Invalided. On leave.	Invalided. To Government Hospital for Insane.	Deserted.	Died.	Continued to 1896.	Total number of sick-days.
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS—continued.												
Subsidiary class 3.—Diseases of the respiratory apparatus.												
Asthma	1	1	3	2	1	2						283
Bronchopneumonitis			3	3								74
Bronchitis acuta	2		23	20	1				1	1	2	645
Bronchitis chronica	3	1	14	8	5	1	1				3	870
Catarrhus bronchialis	1	1	6	7		1						257
Hæmoptysis		1	6	2	1	2					2	691
Laryngitis chronica			3	3								145
Pleuritis acuta	2	1	12	8	2	1					4	720
Pleuritis chronica	1		2	1						1	1	43
Pleuritis purulenta	1	1		1						1		89
CLASS IX.												
Diseases of the motory apparatus.												
Ankylosis			1	1								53
Arthritis		1	3	1			1				2	146
Myalgia acuta			10	9							1	392
Myalgia chronica			16	7	3	3					3	692
Necrosis	1	1		1		1						217
Ostitis			3		1						2	177
Periostitis	2		1	2	1							173
Synovitis	2		4	5							1	223
Thecitis			1	1								53
CLASS X.												
Diseases of the cutaneous apparatus.												
Abscessus	6	1	6	11		1					1	608
Carbunculus			3	3								67
Cellulitis			2	2								38
Clavus			2			1					1	67
Ecthyma		1		1								61
Eczema			7	5	2							335
Furunculus	2			2								17
Impetigo			1	1								23
Lichen			1	1								66
Paronychia	1		2	3								117
Pemphigus	1			1								8
Ulcus	1		7	5							3	328
Unguis involutus			1	1								23
Urticaria		1									1	21
Verruca	1			1								12
CLASS XI.												
Venereal diseases and diseases of the genito-urinary apparatus.												
Adenitis inguinalis (venereal)	20	2	66	67	12	1			1		7	3,978
Arthritis gonorrhoica	3		7	8	1	1						802
Balanitis			4	4								206
Chancroid	5		22	17	2	1			1		6	1,161
Cystitis		1	5	4							2	226
Enuresis	1		2	1	1	1						64
Epididymitis	2		5	5	1						1	316
Fistula urinalis	1		2	1		1					1	81
Gonorrhœa	7	2	56	49	3				2		11	3,189
Hæmaturia			1	1								39
Hydrocele		1	3	2	1				1			201
Nephritis acuta			3	1							2	170
Nephritis chronica	6	1	5	4	2	3				2	1	1,105
Orchitis	4		15	18		1						1,417
Paraphimosis			1	1								135
Phimosis	2			2								50
Prostatitis		1	2	1							2	95
Pyelitis		1					1					82
Spermatorrhœa			1			1						120
Syphilis consecutiva	23	25	96	80	26	9		1	2		26	8,612

TABLE XIV.—*Naval hospitals—Detailed statement, 1895*—Continued.

Diseases.	Remaining from 1894.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to 1896.	Total number of sick-days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS XI—continued.												
Venereal diseases and diseases of the genito-urinary apparatus—Cont'd.												
Syphilis primitiva	4	1	11	11	1	1					3	470
Urethræ strictura	6	1	13	16	1						3	1,118
Urinæ retentio			1	1								3
Other diseases of this class			3	3								34
CLASS XII.												
Cysts and new growths.												
Epithelioma			3	2							1	204
Lipoma			1	1								21
Osteoma	1					1						77
Sarcoma			1	1								34
Other diseases of this class			2		1						1	46
CLASS XIII.												
Injuries.												
Ambustio ex calore	1		2	3								67
Ambustio ex frigore			4	4								237
Asphyxia ex submersione			1	1								63
Concussio		1	2	3								158
Contusio	4	4	13	16	1	2					2	722
Fractura	5	1	32	23	4	1	1			1	8	2,211
Hernia	5	1	15	5	2	12					2	1,044
Luxatio			4	3	1							103
Membri clades		1	3	1	1		1				1	161
Sole excoctus			2	2								2
Stremma	2		14	14	2							551
Vulnus contusum	3			2		1						289
Vulnus incisum			6	5			1					127
Vulnus laceratum			9	8						1		377
Vulnus sclopeticum			4	2		1					1	153
CLASS XV.												
Poisons.												
Alcoholismus	1	4	20	21	1	1					2	563
Venenum neuroticum		3	1	2	1	1						147
Total	234	146	1,263	1,076	174	120	16	8	15	37	197	78,339

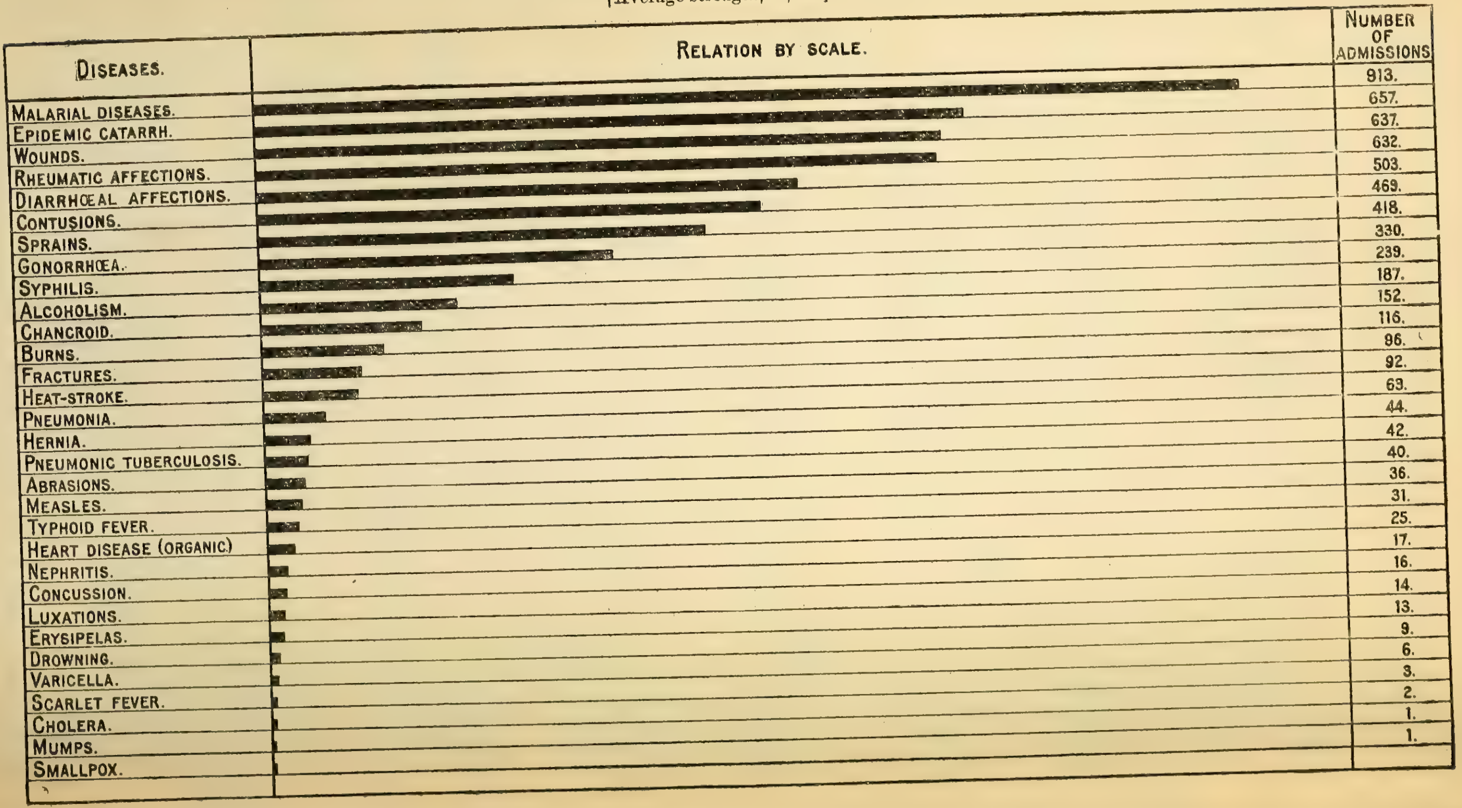
TABLE XV.—*Report of vaccination in the Navy and Marine Corps for the year 1895.*

	One or more good marks.	All indifferent marks.	Successful.	Unsuccessful.	Percentage of success.
Class 1.—Unvaccinated			121	117	50.84
Class 2.—Stated to have been vaccinated but having no cicatrix			100	204	32.89
Class 3.—Vaccinated:					
Character of marks not indicated			101	278	26.65
Having one vaccine cicatrix	1,610	265	469	1,406	25.01
Having two vaccine cicatrices	1,210	146	272	1,084	20.06
Having three vaccine cicatrices	491	56	106	441	19.38
Having four or more vaccine cicatrices	356	52	88	320	21.57
Class 4.—Evidence of former attack of smallpox			4	62	6.06
Total	3,667	519	1,261	3,912	24.37

Total number of persons included in this report, 5,173.
Total percentage of success, 24.37.

TABLE XVI.—*Prevalence of special diseases and injuries in the Navy and Marine Corps during the year 1895.*

[Average strength, 12,671.]



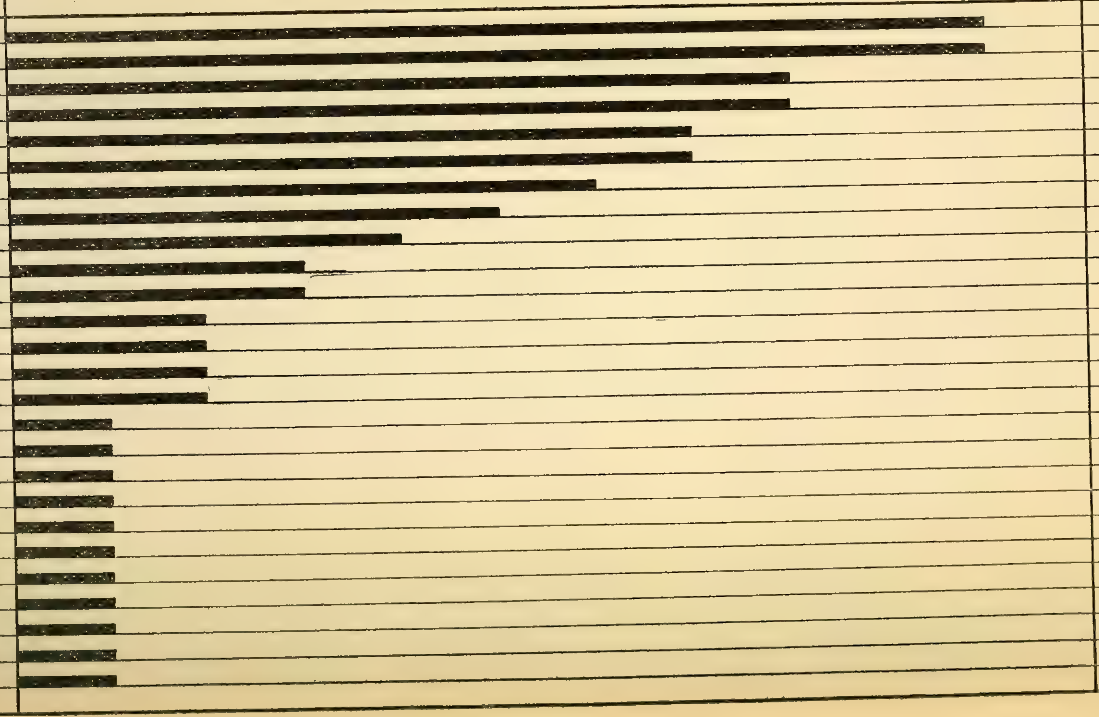
DISEASES.	NUMBER OF ADMISSIONS
MALARIAL DISEASES.	913.
EPIDEMIC CATARRH.	657.
WOUNDS.	637.
RHEUMATIC AFFECTIONS.	632.
DIARRHŒAL AFFECTIONS.	503.
CONTUSIONS.	469.
SPRAINS.	418.
GONORRHŒA.	330.
SYPHILIS.	239.
ALCOHOLISM.	187.
CHANCROID.	152.
BURNS.	116.
FRACTURES.	96.
HEAT-STROKE.	92.
PNEUMONIA.	63.
HERNIA.	44.
PNEUMONIC TUBERCULOSIS.	42.
ABRASIONS.	40.
MEASLES.	36.
TYPHOID FEVER.	31.
HEART DISEASE (ORGANIC)	25.
NEPHRITIS.	17.
CONCUSSION.	16.
LUXATIONS.	14.
ERYSIPELAS.	13.
DROWNING.	9.
VARICELLA.	6.
SCARLET FEVER.	3.
CHOLERA.	2.
MUMPS.	1.
SMALLPOX.	1.

TABLE XVII.—*Mortuary record of the Navy and Marine Corps for the year 1895.*

Causes of death.	Number of deaths.				Average age.
	Hospitals.	Yards and stations.	Vessels.	Total.	
Alcoholismus			2	2	63.63
Aneurysma	3	1		4	39.25
Apoplexia	1	3	1	5	48.67
Appendicitis		1		1	23.00
Asphyxia (boiler)			1	1	28.00
Asphyxia ex submersione		1	7	8	29.57
Asthma			1	1	31.00
Bronchitis acuta				1	61.00
Bronchitis chronica			1	1	52.42
Catarrhus epidemicus	1			1	20.00
Cholera			2	2	22.00
Cholera morbus			1	1	42.83
Concussio			1	1	59.00
Cordis valvularum morbus	5	3	2	10	48.03
Dysenteria acuta			1	1	56.42
Febris enterica	4	2		6	21.92
Febris pneumonica	7	1	2	10	33.33
Febris remittens	1			1	52.58
Fractura	1		1	2	33.17
Hepatitis suppurativa			1	1	30.00
Meningitis	1			1	48.00
Nephritis acuta			2	2	54.50
Nephritis chronica	2	2	1	5	46.23
Obstructio intestinalis	1		2	3	38.97
Peritonitis			2	2	52.08
Pleuritis chronica	1			1	17.00
Pleuritis purulenta	1			1	22.92
Prostratio thermica			1	1	26.00
Rheumatismus articularis acutus	1			1	29.50
Tuberculosis pneumonica acuta	2		2	4	29.96
Tuberculosis pneumonica chronica	3			3	29.58
Venenum irritans (suicidium)			1	1	30.08
Vulnus incisum (suicidium)			2	2	30.92
Vulnus laceratum	1			1	22.00
Vulnus punctum (homicidium)			1	1	22.00
Vulnus sclopeticum (suicidium)		1		1	50.92
Total	37	15	38	90	37.40

TABLE XVIII.—*Deaths in the Navy and Marine Corps during the year 1895.*

[Average strength, 13,191; total number of deaths, 90; ratio per 1,000 of strength, 6.82.]



CAUSES OF DEATHS.	NUMBER OF DEATHS.
PNEUMONIA.	10.
HEART-DISEASE.	10.
DROWNING.	8.
LOCAL INJURIES.	8.
PNEUMONIC TUBERCULOSIS.	7.
KIDNEY-DISEASE.	7.
TYPHOID FEVER.	6.
APOPLEXY.	5.
ANEURYSM.	4.
INTESTINAL OBSTRUCTION.	3.
POISON.	3.
BRONCHITIS.	2.
PLEURISY.	2.
PERITONITIS.	2.
CHOLERA.	2.
CHOLERA MORBUS.	1.
DYSENTERY.	1.
REMITTENT FEVER.	1.
RHEUMATISM.	1.
ASPHYXIA (IN BOILER.)	1.
APPENDICITIS.	1.
ASTHMA.	1.
HEPATITIS.	1.
HEAT-STROKE.	1.
EPIDEMIC CATARRH.	1.
MENINGITIS.	1.

REPORTS ON UNITED STATES NAVAL HOSPITALS.

REPORT ON NAVAL HOSPITAL, CHELSEA, MASS

By John H. Clark, *Medical Director, United States Navy.*

The hospital—granite, of block system—is solid and durable, but not well ventilated nor well heated. The drainage is old, requiring frequent overhauling. The plumbing is old and has been frequently repaired, so it is frequently giving away, requiring slight temporary repairs. The same is true of the water and steam pipes, not only in the hospital but in other buildings, although neither need complete renewal at present. That portion of the kitchen floor under the copper boilers and sink has been renewed and releaded, and slight repairs have been made from time to time to the two kitchen ranges. The roof of the hospital has been reslated and new copper has replaced copper and tin over a portion of the roof. New copper conductors and gutters have been supplied. The outside woodwork of all the windows has been painted with two coats of lead paint and they have been reputtied where necessary. Some of the window sashes are so decayed that they will have to be replaced before long. The doors, in places, are so worn as not to close tight, and their handles and locks are weak. The cellar is necessarily damp, owing to the percolation of water from the spring soil of the hill in rear of the hospital, which is situated on a sloping bank. The brick floor is old, broken, and uneven, but this condition does not impair the durability of the hospital. The hospital is cool in summer but cold in winter. It is a sanitarium for those affected with malaria and unsuited to those affected with pulmonary or rheumatic troubles.

QUARTERS OF SENIOR MEDICAL OFFICER.

The slate and tin are being replaced over the whole roof of house and verandah, including that portion previously covered with paper. The roof leaked in several places after heavy rains, and especially after heavy snowstorms, as the snow melted. Double windows have been supplied the main part of the house. Many window sashes are weak from decay—as in all the buildings on the grounds—due to water collecting, both inside and outside, between glass and sash where the putty has become loosened. The range is old and has been frequently repaired. Many of the doors are worn and loose as in the hospital.

PESTHOUSE.

Fortunately there has been no use for this building for the reception of contagious diseases for several years. It is in fair condition and ready for use. The following repairs have been made this year:

1. A new range has been placed in the kitchen.
2. The outside of the woodwork of windows has been painted and reputtied where necessary.
3. The piazza has been repaired and painted.
4. The tin roof of the L has been painted.

This building has no cellar and is set on a brick foundation, which is settling somewhat. The ground is low and very wet, in fact saturated with water much of the time; consequently the floor timbers are decaying, but need no immediate attention. It has been considered expedient to keep a watchman in the building at night for its protection. This involves some expense for fuel, light, and water. The watchman, in this case, is a laborer, who renders valuable service by day.

LAUNDRY.

This building is old and the roof leaked in several places, and some of the supporting timbers of the roof had settled. The gutters and conductors were so decayed as to be useless. The roof has been reshingled, new gutters and conductors are in place, and the outside woodwork of the windows has been painted. The furnaces have been relined with fire brick.

STABLE.

Slight repairs have been made as puttying and painting outside of windows and repairing roof of ambulance shed, which is poorly constructed, nearly flat and covered with asphalt, and leaks frequently.

GROUNDS.

The hospital lands contain 75 acres, divided into pasture, arable land, cemetery, pesthouse grounds, and hospital grounds proper. This land is depreciating annually from want of cultivation and fertilizers. The daisy, the sorrel, and the dandelion have supplanted the grass to a large extent. I can not, however, recommend the employment of labor or fertilizers required to put the farm in productive condition, as the pecuniary outgo would exceed the income. A few acres are cultivated to advantage as a garden, supplying fresh vegetables in considerable variety to patients and employees, reducing the provision bill perceptibly in the fall months.

The surroundings of the grounds are objectionable at two points—the northwest corner of the pasture on Williams street and near the main gate on Broadway. Persons living in these localities frequently trespass on the grounds, which our limited police force can not wholly prevent. The public are allowed, with limitations, quite free access to the grounds in front of the hospital. This enables undesirable characters to enter, especially in warm weather, who smuggle liquor, trample on the grass, lounge in the cemetery, and otherwise add to the difficulty of keeping the grounds in order.

REPORT ON NAVAL HOSPITAL, BROOKLYN, N. Y.

By THOMAS N. PENROSE, *Medical Director, United States Navy.*

Of the total number of patients discharged during the year, there were 141 transferred to other hospitals in order to facilitate the plans of improvements and repairs which are being carried out under the direction of the Bureau of Medicine and Surgery.

The extensive alterations in the interior construction of the hospital building, necessitated a temporary contraction of the space allotted to the sick.

The general plan of improvement in the hospital itself includes an extensive renovation of the woodwork, flooring, plastering work, and paint work.

Certain rooms designated for the accommodation of sick officers are by rearrangement, made into suites of three rooms each, so that each officer shall have, instead of a single room, which, in some instances, is smaller than is considered desirable, two rooms with bathroom and closet attached.

By judicious arrangement, this very great addition to the comfort of the occupant is accomplished with the minimum sacrifice of other considerations.

The total air space allotted to each patient under the former arrangement is considerably increased in these apartments made en suite.

Rearrangement of medical officers' quarters is also carried out in a similar manner.

Complete renovation of the plumbing, overhauling of the entire system of water supply and drains, with the substitution of new and improved bath tubs of enameled iron, and of marble basins with modern connections and traps throughout, together with a considerable increase in the number thereof is contemplated.

The old catch-basins are eliminated and direct sewer connections made.

Although electricity is the illuminating medium employed, it is provided that the building be repiped for gas, so that in the event of the failure of the current from any cause, no embarrassment would result.

A new feature is the installation of a modern-type electric elevator of ample capacity to accommodate a ward litter with patient and attendants.

The steaming capacity of the boiler house is considerably augmented by the addition of a horizontal steel return tubular boiler, designed to carry a gauge pressure of 80 pounds. Additional radiators are also distributed throughout the building.

The corridors on the first floor are to be laid in vitrified tile of neat design, and the main stairway replaced by a new one.

In addition to improvements in hospital building, there is to be erected in the courtyard a three-story structure of brick in which will be located the mess-hall, dispensary and chapel, and operating room.

The operating room is to be 25 by 45 feet, well lighted by a large central skylight. The floor is to be of smooth vitrified tile, with a gentle slope from all sides to a central drain, of most approved construction.

The walls will be finished in cement, and a curved glazed tile base will make connection between the floor and the walls.

Adjoining the operating room, and with it constituting the entire third floor, are the etherizing, recovering, and sterilizing rooms, and also accommodations for medical officers to prepare themselves for operating.

Across the driveway, in the rear of the courtyard building, a two-story brick structure is designed, on the first floor of which is located the kitchen, with steam cooking apparatus and two large modern ranges in the equipment.

On the second floor a commodious smoking room for convalescents is provided, having a "kosmocrete" floor.

Both buildings are to be electric lighted, steam heated, and artificially ventilated.

REPORT ON NAVAL HOSPITAL, PHILADELPHIA, PA.

By D. KINDLEBERGER, *Medical Director, United States Navy.*

I have the honor to report that during the year ending December 31, 1895, there were treated in this hospital 394 patients, including beneficiaries from the Naval Home as well persons on the active list of the

Navy and Marine Corps, an increase of 67 over previous year. Of these, 294 were discharged to duty, 27 were invalided from the service on survey, 15 died, 4 deserted, 1 was invalided to sick leave, and 53 were continued to following year.

The following is a list[1] of the classes of diseases under which they were admitted:

Class I.	Parasites and parasitic diseases	1
II.	General infectious diseases (nonvenereal)	81
III.	Constitutional disorders of nutrition	10
IV.	Diseases of nervous system	24
V.	Diseases of visual apparatus	9
VI.	Diseases of auditory apparatus	1
VII.	Diseases of olfactory apparatus	1
VIII.	Diseases of nutritive apparatus:	
	Subsidiary class, 1. Digestive apparatus	19
	2. Circulatory apparatus	18
	3. Respiratory apparatus	22
IX.	Diseases of motory apparatus	15
X.	Diseases of cutaneous apparatus	8
XI.	Venereal diseases and diseases of genito-urinary apparatus	87
XII.	Cysts and new growths	3
XIII.	Injuries	49
XV.	Poisons (alcoholismus)	46
	Total	394

It will be seen that the class of venereal and genito-urinary diseases contains the largest number of admissions. Of the 87 cases, 36 were cases of syphilis. In this connection it has occurred to me that syphilis in the Navy probably does not receive as complete and lengthy treatment as it might from the fact that cases are necessarily returned to duty before the poison is completely eliminated. On account of the time required for complete cure, this class of patients can not be retained in a hospital without loss of service to the Government and sometimes a demoralizing effect upon the patient. It is the custom in this hospital to discharge patients with this disease as soon as the danger of infection of others is over, and they are enjoined to continue treatment for a year or two and to report to the medical officer from time to time so that they can be kept under observation and treatment until permanently cured.

Class II, general infectious diseases, consisted principally of cases of febris remittens (Malta fever), tuberculosis, and seven cases of morbili received from the U. S. S. *Indiana* and U. S. R. S. *Richmond* at League Island.

The 46 cases under Class XV, poisons, were all cases of alcoholismus, all but 1 occurring among beneficiaries.

Twenty-seven cases were invalided from the service on survey, with the following diseases:

Dysenterica chronica	1	Cordis palpitatio	1
Rheumatismus, articularis, chronicus	3	Asthma	1
Tuberculosis pneumonica, acuta	1	Hæmoptysis	2
Tuberculosis pneumonica, chronica	7	Myalgia chronica	1
Dementia	1	Enuresis	1
Hemiplegia	1	Nephritis chronica	1
Monoplegia	1	Hernia	3
Neuritis optica	1		
Retinitis	1	Total	27

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[1] Refer to pages 32, 34, and 55 for statistics of this hospital relating exclusively to the active list of Navy and Marine Corps.

The 15 deaths were from the following causes:

Tuberculosis pneumonica chronica	5	Nephritis chronica	2
Debilitas senilis	1	Carcinoma	2
Hemiplegia	1	Fractura (pelvis)	1
Aneurysma	1		
Cordis valvular. morbus	2	Total	15
Broncho-pneumonitis	1		

Twelve of these deaths occurred among beneficiaries, whose average age was $63\frac{7}{12}$ years.

Total number of sick days	13,519
Daily average of sick	37+

The improvement in the sanitary condition of this hospital has been continued, and a great advance made in bringing it up to a modern standard.

The necessity for additional room, obtained by fitting up the north wing, was amply demonstrated. Without it, the overflow from the New York Hospital could not have been accommodated nor patients properly isolated.

Probably for the first time in its history the hospital is now provided with a modern operating room, properly equipped for the aseptic performance of operations.

The small ward on the ground floor of the north end of the building was devoted to this purpose. The room was prepared as follows: The ceiling and walls, to within six feet from the floor, were painted with two coats of lead paint. The walls, to a height of 6 feet, were painted with three coats of "porcelain enamel" paint. All woodwork and metal were painted with two coats of "xylo enamel" paint. All cracks in floor were filled with putty and on this was placed one coat of buff-colored stain; this was covered with one coat of shellac and this finally by two coats of "floor enamel" paint.

The room was provided with a chandelier with six Welsbach burners, and will also be provided with a ten-light cluster electric light. Chandeliers will be provided with drop-light attachments for illumination of cavities and for endoscopic or laryngoscopic illumination.

A steam radiator was also placed in the room for heating, and a porcelain sink and wash basin provided.

The room was provided with the following furniture:

Two glass shelves, 1 with glass rods for holding towels; 1 Sprague-Schuyler water sterilizer with 2 tanks 15 gallons each, 1 Sprague-Schuyler dressing sterilizer, 1 Sprague-Schuyler instrument sterilizer, 1 Boldt's glass operating table, 1 white enameled iron stool, 1 revolving washstand with 3 bowls (glass), 2 glass-top tables, 1 2-gallon glass irrigator, 4 white enameled basins, 2 white enameled pitchers, 1 immersion washstand, 2 glass trays, 1 porcelain ligature tray, 1 glass ligature box, 1 instrument cabinet (glass), 2 white enameled iron chairs, 2 white enameled pus basins, 2 white enameled pails, 1 wheeled stretcher, 5 glass jars, 6 linen operating aprons.

Other improvements were as follows:

Four rooms containing water-closets, 4 bathrooms, and 4 wash rooms were tiled with porcelain tiles to a height of 5 feet and the ceilings and upper part of walls painted.

Twenty-four wash basins and 2 sinks were removed and replaced by new ones of porcelain and waste pipes properly trapped.

The greenhouse was repaired and enlarged and brick ash pit placed in engine-house yard for the reception of ashes and other rubbish, preventing it from being scattered over yard, as heretofore.

Two old elevators were removed and replaced by new.

The annual repairs to boilers and steam-heating plant were made and a great many of the hot-water pipes were replaced by new.

In addition, quite a number of minor repairs have been constantly made by the hospital force.

The introduction of the electric light will be a great improvement, and the requisition having been approved, the work of wiring the building will soon be commenced.

Although much has been done in the way of improvement, there are still defects in the heating system, to which attention is called.

Since the north wing of this hospital has been put into commission it has been found that our steam-heating plant is inadequate for proper heating of the entire building during very cold weather.

Additional radiators have been introduced and steam pipes repaired, but these constantly leak, and it is only too evident that it will soon be necessary to overhaul the present system and replace all steam pipes by new. Many of the pipes have been in use since the completion of the building and are so corroded that they will not stand sufficient pressure to properly heat the building. The absence of expansion valves entails a great waste of steam, and the weakness of the pipes does not permit the use of these or other devices for the saving of steam.

It is respectfully recommended that the present system be examined by experts, some method of heating be decided upon, and repairs or changes made during the coming summer, so that the building can be properly warmed during exceptionally cold weather.

The present system of indirect radiation, although probably more hygienic, is more expensive than one of direct radiation.

During the last quarter of this year we received from the U. S. S. *Indiana* and U. S. R. S. *Richmond* 7 cases of morbilli. The proper isolation of these cases necessitated the use of two of the small wards, causing a crowding of the other patients for the time being, and had cases of some other contagious disease been received at the same time serious inconvenience would have resulted. It is very desirable that there should be a separate building for contagious diseases. A small building could be erected on top of the old ice house, at present used as a storehouse.

The need of a separate room properly fitted up for the care of patients who suddenly become mentally affected, or for the restraint of alcoholic cases, of which a large number is treated, has been frequently felt. One of the small wards is generally used for this purpose, thus further reducing the capacity for cases requiring isolation.

There is great need of a steam disinfector for the disinfection of mattresses and all articles belonging to patients treated for contagious diseases. Patients always bring with them their belongings, many articles of which can not be properly disinfected except by subjection to heat. If sufficiently large, mattresses, pillows, and all bedding could be disinfected at once and the danger of contagion reduced to a minimum, besides affording a convenient method for the destruction of vermin.

The necessity for a proper ambulance is very urgent. It is scarcely humane to transport a patient with pneumonia from League Island to this hospital in the present conveyance. A new ambulance naturally suggests the introduction of telephone service for rapid communication with League Island. At present it requires at least one day and often two to obtain the ambulance from League Island when patients are returned to duty.

A new ambulance will necessitate enlargement of the present stable. For this purpose it is suggested that the bricks in the pavement of basement of this hospital be used and the pavement replaced by a new one of cement.

REPORT ON NAVAL HOSPITAL, WASHINGTON, D. C.

By GEORGE A. BRIGHT, *Medical Inspector, United States Navy.*

The most noticeable feature in the statistics of the year is the large number of cases of malarial fever received from the navy-yard and marine barracks, amounting during the twelvemonth to 69; the number in the preceding year was 14. The cause of this is perhaps the unusually low state of the water in the East Branch, whereby the flats in the river were much more uncovered near the navy-yard. Only 1 death, however, is ascribed to malaria, and in this case the nature of the disease was obscure and the symptoms ill defined. Many of the cases were lingering; few were really severe. Gastric symptoms were the most conspicuous. Those in whom there was only a moderate rise of temperature were the most protracted cases. Often it happened, however, that a patient ceased to have fever altogether after he had been twenty-four hours in hospital, though during his stay at the navy-yard or marine headquarters he had had regular paroxysms. In some instances the disease for a time simulated typhoid fever. The type of fever was more often remittent than intermittent, and was occasionally rebellious to quinine.

There was 1 case of epithelioma of the penis, which is still under treatment. The starting point of the disease was a congenital adhesion of the prepuce to the glans penis, apparently of a simple character. Circumcision was performed for this. An ulcer remained at the place of the original adhesion, which healed only after varied treatment during several months. And it was not till then that the disease was definitely known to be epithelioma. He was transferred then to this hospital; the penis was amputated in May, 1895, and he was discharged to duty in August, having made a fairly good recovery, but having an enlarged gland in right groin. Later the gland enlarged rapidly and was imperfectly removed while he was on leave. He was readmitted here October 18, 1895, with involvement of all inguinal glands and deep ulceration of those on the right side. Radical removal of glands was deemed not practicable. He has since been treated by proto-nuclein, both internally and locally; then, successively, by the hypodermic use of nucleinic acid; by the ferment therapeutique of De Backer, of Paris, which is also a nuclein preparation; and finally by the combined antitoxines of erysipelas and diphtheria—all without effect.

Hypodermic injections of nucleinic acid were used in three cases of chronic phthisis during the year. All three were benefited, as shown by their own declarations, by their visibly improved aspect, and by their gain in weight, the gain amounting in one instance to 12 pounds in three months. These patients were all discharged, by their own request, before it could be certainly known how permanent this improvement would be.

No material changes have been made during the year in the hospital or grounds. Quite recently the work of paving Tenth street was begun, but is not completed.

The electric-light service continues to be somewhat unsatisfactory. The company constantly promises improvement, but has succeeded in doing little. Several times it has been necessary to use gas temporarily because of failure of the electric lamps.

The Loomis filter, through which all water passes for the use of the hospital, is quite inefficient as a purifier after heavy rains. Perhaps, however, no system of rapid filtration would do better under the present system of water delivery in this city.

The Pasteur filter works well, but at times delivers an insufficient amount of water for drinking.

REPORT ON NAVAL HOSPITAL, NORFOLK, VA.

By C. J. Cleborne, *Medical Director, United States Navy.*

The following interesting surgical cases have been under treatment during the past year:

Two cases of stricture in pendulous portion of urethra were treated by internal urethrotomy, with satisfactory results.

One case of empyema (following pneumonia) required resection of 1½ inches of right fourth rib. About 1½ quarts of pus were removed from pleural cavity. Thorough drainage was established by rubber tube, and the tube was removed on forty-second day. The lung expanded considerably, and patient was discharged to duty well.

One case of hydrocele was treated by simple tapping, but as exudate returned a second tapping was necessary. Two weeks later the sac refilled; after a third tapping (Lugol's solution being injected) a cure resulted in a little over one week.

One case of lipoma of back of neck of the size of a hen's egg was removed under cocaine anæsthesia.

One case of fistula in ano was successfully treated by freely laying open the fistula.

One case of extensive ascites was treated by repeated tapping. Five quarts of fluid were removed at the time of the first tapping. Two weeks later 2½ quarts and one month later 3¼ quarts were drawn off. The stream stopped suddenly. By introducing a long probe through canula and holding back the omentum, all fluid was withdrawn. No recurrence after six months. Clinical diagnosis was large white kidney and cirrhosis of liver.

Of the medical cases the following deserve special mention:

Seven cases of morbilli passed through the disease without serious complications. In two, otitis media purulenta followed. One case required paracentesis of membrana tympani. No defect of hearing remained.

One case of varioloid from the U. S. S. *Columbia* came under treatment. On admission, the face, scalp, chest, arms, and legs were found covered with a vesicular eruption, pocks distinctly umbilicated, three vesicles on hard palate. Patient had been vaccinated four weeks previously; some of the vesicles were larger than a pea. The temperature was atypical, decidedly remittent, and became normal on the twenty-sixth day. The vesicles matured, formed scabs, and fell off by the twenty-fourth day. The case required little or no treatment.

Of seven cases of pneumonia, five recovered promptly on the supporting treatment. Delirium tremens developed in one case after the occurrence of the crisis on the fifth day. It lasted three days. In this case the right, upper, and lower lobes were affected. Of the fatal cases, one died on the eighth day. Autopsy showed the right upper lobe in the stage of hepatization, the right lower lobe in the state of red hepatization. A second case terminated fatally on the seventh day. Patient was a hard drinker and developed delirium on the third day. Autopsy showed left upper lobe involved. The apex in stage of red hepatization. The lower portion of upper lobe in gray hepatization. Left lower lobe was congested and compressed by a pleuritic exudate.

One death during the course of catarrhus epidemicus was due to heart failure. Autopsy showed a "fatty heart."

The following case deserves more minute mention on account of its rarity: The patient was readmitted with a diagnosis of "heart disease." He had been rapidly losing flesh for about one month; had suffered from dyspepsia and dyspnœa, with pain about epigastrium and lower part of chest. On admission, July 8, patient was decidedly cachectic, had marked œdema of legs, suffered from dyspnœa on the slightest exertion, which was supposed to be due to valvular heart disease, especially as a systolic murmur could be heard over apex. Urine was free from albumen, which developed later. Superficial abdominal veins were distended, marked ascites was present, epigastric region was distended. On July 30 evidence of fluid in both pleural cavities (more on right than on left side) was found. Removed 500 grams of fluid from left side by means of a trocar. Dyspnœa was much lessened in consequence. The benefit derived from this was, however, of short duration. Distention of abdomen having increased, 1,000 grams of a reddish serum were removed from peritoneal cavity by means of aspirator. August 5, on account of distressing dyspnœa, 1,000 grams of fluid were removed from left pleural cavity. These measures relieved patient markedly for the time being. His general weakness, however, steadily increased, and he died from exhaustion August 8, 1895. *Autopsy.*—Body very much emaciated, rigor mortis well marked. Thorax and abdomen were opened by the usual incision. Abdomen contained a large amount of a turbid fluid. Left pleural cavity nearly filled with the same fluid. Left lung compressed. Right pleural cavity also contained fluid, but to a much less degree than opposite side. Peritoneum very red. Small intestines look shriveled. Pericardium free from fluid. Heart firmly contracted. Right auricle contained post-mortem clots, ventricle empty, valves normal, with exception of thickening of corpus arantii. Liver of normal size, lobules distinct, consistency a little increased. Spleen small. Intestines, omentum, and pancreas removed together. Nothing abnormal in intestinal lumen. After intestines had been removed from mesentery, the firm mass (weighing about 1½ pounds), consisting of pancreas and duodenum, remained. In opening duodenum, a grayish yellow opening large enough to admit a finger was found leading into a gangrenous cavity in the pancreas. The innermost part of its wall was soft, becoming harder and reddish peripherally, and finally passed over into a substance composed of acini separated by thick connective tissue. The pancreas contained large blood vessels, some of which were filled with firm coagula. In the apices of both lungs were calcified round masses of the size of hazelnuts, round and regular in outline. The pleural surfaces corresponding to these nodes were adherent.

Aneurism of the transverse portion of aorta.—This patient, aged 29$\frac{9}{12}$ years, gave a history of syphilis contracted eight years ago, for which he had been treated three months. Until April, 1895, had enjoyed comparatively good health. At that time manifestations of sickness appeared, viz, a severe pain in region of left shoulder blade and in left arm, which followed sleeping on deck. The pain persisting, he went to the New York hospital for treatment. While there "syphilitic manifestations of a mild character, solidification of the left apex, impaired voice from ulceration of vocal cords, constant cough, and abundant muco-purulent expectoration were noted." Patient was transferred to the hospital at Chelsea, where consolidation of left apex "without râles" was found. Transferred to the naval hospital, Norfolk, during the latter part of October, 1895, patient on inspection presented a phthisical aspect, with clear complexion, bright eyes, hollow chest, weak voice, persistent cough, and marked emaciation, etc. Close examination, however, during this later stage of the disease produced discrepancies that could not be harmonized with phthisis. Inspection of the chest showed slight prominence on left side in front, corresponding with second and third ribs near their junction with sternum. Enlarged superficial veins on the same side in the upper part of chest, no visible pulsation of vessels of neck. The prominent portion on chest was tender on pressure and on percussion. On percussion there was a dullness in front on left side, bounded above by clavicle, reaching from right sternal border about 3½ inches to the left; depth of dullness (at that end) was about one inch, gradually increasing in a direction inward and downward and going over into the area of cardiac dullness. Lower border of dullness extended to about fourth rib, right border of dullness corresponded to right sternal margin. A slight diffuse impulse (which was taken for the apex beat) could be felt on a level with nipple about half way between nipple and sternal margin. There was absence of fremitus, voice sound and respiratory murmur over dull area. Heart sounds were distinct, but rather feeble. There was no bruit. Above the left clavicle the respiratory murmur was bronchial, no râles. Inspection of neck showed larynx and trachea pushed to the right, the latter more so than the former. Voice husky and feeble. Patient complained of a feeling of tightness in throat and of an almost constant desire to clear his throat. Expectoration very scanty; mucous in character. Left brachial and radial pulses were absent. Right radial pulse weak, but constant. Left carotid pulse very feeble, and during the last days preceding death absent. Posteriorly, dullness was found between left shoulder blade and spine, auscultation revealed a systolic blowing murmur. The principal subjective symptoms were cough, paroxysmal attacks of dyspnœa brought on by excitement or slight exertion, and difficulty of swallowing. The dyspnœa at times was very distressing. Patient gradually failed, and died in one of his paroxysms of dyspnœa. In the differential diagnosis, tumors, encapsuled pleuritic exudate, and aneurism were considered; the diagnosis was positively arrived at by the introduction of an aspirating needle into most prominent portion of tumor. Suction brought blood, and a spurt of blood followed withdrawal of needle.

Autopsy.—Body of an anæmic, emaciated young man. Rigor mortis well established. Larynx and trachea in median line of body. Incision from about cricoid cartilage to pubes. Removed sternum in usual way. Posterior surface corresponding between second and third ribs eroded. On left side, the ends of ribs and about half of the clavicle were removed to fully lay open left side of chest. Region of heart from fourth rib occupied by a mass having irregular, streaky, and knotty surface, which to the left extended in a curved line upward and outward, and was adherent to chest wall by firm adhesions and above was bounded by clavicle, while to right its limit was the normal boundary of the heart. Left lung adherent in its upper portion to the chest wall and to the above-mentioned mass. It being desirable to study the relations of heart, lungs, and large vessels to each other, a transverse incision was made at neck, and trachea, œsophagus, vessels, and contents of chest removed together. A smooth sac was found, behind which lay the heart (which had not been seen so far), pressed against the posterior chest wall. The mass was a hollow body, made up of organized fibrin. Greatest thickness of its interior wall, 1½ inches; thin posteriorly where it had rested against heart. Its cavity had been filled with dark clots and blood. Inner surface of cavity wavy, but smooth. Connecting with this cavity, through a round opening with smooth edges, was the arch of the aorta. The opening being on its anterior wall, was of the size of a 5-cent piece. The weight of organized hollow clot was, after having been in alcohol some time, 13½ ounces. In shape it resembled a large heart. Its dimensions were 6½ by 4½ by 2½ inches. The compressed upper lobe of left lung and anterior layer of pericardium formed part of the aneurysmal sac. In the sac wall were found the upper portion of the left bronchus, also all the branches of the arch of the aorta. Those given off on the left side were elongated and narrowed. The left subclavian artery was smaller than the radial artery. Heart was normal. There were no marked changes in coats of aorta. Larynx showed no abnormal changes.

HOSPITAL AND GROUNDS.

During the last fiscal year a good deal has been done for this establishment, and the following improvements have been made.

The hospital roof has been thoroughly repaired and painted. The south wing has been renovated by replastering its walls and ceilings with cement, introducing combination electric fixtures, mending ward floors, and repairing and repainting woodwork of wards and verandas.

Steam heat was introduced under the supervision of Chief Engineer Rearick, United States Navy, and an electric-light system has been installed. A new operating room and lavatory, etherizing, sterilizing, dressing, surgical, and receiving rooms have been added, and these will soon be fitted with the latest surgical appliances.

Two new 30-horsepower boilers (built at navy-yard under supervision of Chief Engineer Dungan, United States Navy) have been placed in boiler house, and the latter has been enlarged and repainted. A new 4-inch main ground pipe (incased in wood) has been laid between director's quarters and boiler house, and the supply of heat for house and hospital appears to be sufficient, but is uncontrolled by any automatic arrangement. The said main pipe, not being entirely connected with "flanged joints," is already showing leaks along the marshy ground in which it is laid; so it is probable that all the joints will have to be "flanged."

The wagon shed has been repaired and refloored with cement concrete, and a new hospital wharf and boathouse, designed by Civil Engineer Adolfo Menocal, United States Navy, has also been erected.

The director's house has been repaired and slated, giving greater accommodations in attic, and decreasing the summer heat in lower rooms of house at least 10° F. The coal and wood sheds of these quarters were also repaired.

Besides the above improvements, considerable work has been done in trenching, ditching, and draining; repairing of roads, paths, brickwalks, and brick walls; repiping and repairing inside and outside steam and water pipes; repairing fences, woodwork of outbuildings, hospital pantry, and corridor; painting main gate, Green street fencing, the outside of director's house, and the inside of medical officer's quarters in hospital.

RECOMMENDATIONS.

1. The annex of hospital needs renovation, or, better still, rebuilding and enlarging, as its condition is unsafe.
2. A new kitchen range is needed.
3. Roads need reshelling.
4. Pier and boathouse in front of director's quarters need repairs.
5. The brick beach wall requires resetting and recoping to prevent "wash" from river boats.
6. Bridge of Gas Creek needs repair.
7. Fort Lane gatehouse needs repair.
8. A new hedge for cemetery is required.
9. Elevator is needed for operating room.
10. New stable is very much needed.

REPORT ON NAVAL HOSPITAL, PENSACOLA, FLA.

By JAMES S. HOPE, *Passed Assistant Surgeon, United States Navy.*

The supplies furnished during the year, especially those received on open-purchase requisition, were satisfactory.

The hospital grounds have been cleaned of underbrush and weeds; the fences and latticework under the buildings have been whitewashed.

I requested the commandant of this station to direct the clerk in charge of the department of yards and docks at this yard to examine the buildings in the hospital inclosure and to report such needed repairs and immediate improvements as he deemed necessary, with the estimated cost of labor and material. I shall forward the report to the Bureau, and I recommend that the repairs be made under the supervision of Yards and Docks, as I believe that better material and more faithful work can be obtained than in letting such work out by contract. In my opinion the work recommended is needed for the preservation of property.

I append a résumé of the recommendations:

1. *Hospital wards and dispensary.*—Defective shingles need renewing, flashing around chimneys require repairing. All of the main and veranda gutters need resoldering in joints and refastening in different places. Slight repairs to shutters. Decayed places in veranda fascia boards should be cut out and renewed. All of the exterior woodwork, including veranda floors, needs two coats of paint.

2. *Surgeon's quarters and officers' wards.*—About 12 feet of ridge board need renewing. Defective shingles should be renewed and gutters on main and veranda roofs need soldering and changing in defective places. About 18 decayed boards in veranda floor should be renewed. The veranda fascia boards and latticework need repairing in about 13 panels. A new platform for cistern is needed. The plastering in kitchen is broken out and needs renewing, while that in other rooms is cracked and should be repaired. The exterior wood work, including veranda floors, needs two coats of paint.

3. *Water-closet for wards.*—The roof of this building is entirely decayed and needs renewing, as do the seats, boxes, and shutters. The building needs painting.

4. *Water-closet for surgeon's quarters.*—Slight repairs are needed to weatherboarding. The boxes and platforms under seats, as well as shutters for same, should be renewed, and the building painted.

5. *Kitchen.*—The veranda floor, sills, and joists are decayed and need renewing. Two veranda columns need renewing. Fifteen feet of guttering and 46 feet of leaders are gone and require renewing. Two window shutters require renewing. All of the exterior woodwork requires two coats of paint.

6. *Ice house* (*used as storehouse*).—Lower floor needs to be made entirely new.

7. *Gates.*—One of the small gates in the south entrance needs renewing and another should be repaired. All gates require painting.

REPORT ON NAVAL HOSPITAL, MARE ISLAND, CAL.

By GEORGE W. WOODS, *Medical Director, United States Navy.*

All cases of special interest have been duly recorded under Form K, with details of the necropsies in those ending fatally, and do not demand repetition, save in two instances, where the conditions causing death were so interesting or peculiar as to make their incorporation in this annual report desirable.

The first was a case of "fracture of the skull, with cerebral hemorrhage." The patient, an officer, was superintending the moving of the dry-dock caisson, when a bridle attached to a stout hawser used to guide the caisson slipped, the hawser suddenly straightened and struck the officer on the right temple, further cerebral injury being caused by contact with margin of stone dock in falling.

On admission, at about noon of the 26th of January, he was semiconscious, and answered questions with intelligence, though slowly, his hearing being unimpaired, but was totally blind, which, with hemorrhage into the orbital cavities and eyeballs, located the injury as involving the sphenoid and articulating connections. He seemed to be in no pain, being under the influence of a profound shock, drank freely, and desired several times to rise from his bed to urinate.

Three hours after admission reaction was established, the temperature began to rise with increased fullness of pulse, cerebral hemorrhage was resumed, and he speedily sank into a condition of profound coma, from which he never recovered. Death occurred at 7 a. m. of the succeeding day.

The necropsy revealed a crushing fracture of right parietal and temporal, frontal, sphenoid, and ethmoid bones, with laceration of middle meningeal artery of right side, other arterial branches at base of brain, and injury to right cerebral lobe from displacement of sharp osseous fragments. The fractures included nearly the whole area of the orbits.

The second case has already been reported, but I herewith beg leave to repeat its history, which has many unique and interesting features.

The following case, with which I was associated from 1886 until it ended fatally in June, 1895, presents features of such unique peculiarity and interest that I am led to consider it as the most remarkable which has fallen under my observation in the course of my professional career.

The subject of it was an apprentice boy who, while attached to the U. S. S. *Alaska* in the summer of 1882, and on liberty at Callao, Peru, was stabbed in a general row between Peruvians and foreign seamen, the knife or dagger entering a lower posterior intercostal space, in the axillary line, and ranging downward and inward. Traumatic pleurisy supervened, and empyema, and patient was transferred to the naval hospital on the arrival of the ship at Mare Island.

At the hospital he remained some months, and when discharged had so far recovered as to accept employment with a street railroad company as the driver of a horse car. While thus engaged he sustained a compound fracture of the humerus, and on recovery from this accident entered my employment at Mare Island, where he studied pharmacy and was subsequently appointed an apothecary. He was then in fair health, ruddy and rosy, having, however, a chronic cough, and the abundant sputum caused me to denominate it a bronchorrhea.

In 1890 he developed symptoms of phthisis in both lungs, with hectic fever, and from this date began to emaciate and lose the hue of health. Simultaneously he had excruciating pain in the left lumbar region, and commenced the use of morphia, which became a necessity to him, the habit thus established continuing through the remainder of his life. This region was aspirated and a considerable amount of pus removed, the cavity closing up and healing after several months, though pain never entirely ceased. In 1893 a swelling appeared in the left groin, which was pronounced to be a psoas abscess and believed to be but a continuation of the processes above, the pus gravitating to this lower point. On opening it pus flowed freely and continued to drain away for a long period, eventually closing. Pain, however, he claimed to be so constantly present that the use of morphia was not only kept up, but the quantity of the drug so augmented that at this time he was taking 15 to 20 grains each day, and in consequence he exhibited all manifestations and conditions of the victim of the morphia habit, to which were added those of cocaine, which he also used in large quantities.

The last phase of this case was when he was admitted with peritonitis (?) to the naval hospital, Mare Island, Cal., on the 17th of March, 1895, his hospital ticket practically stating that he had "intestinal obstruction, producing colic, the obstructive condition probably being due to bands of adhesion related to an old peritonitis."

The pains were intense, and the amount of morphia was continually increased to give relief. Calomel and ol. ricini acted, however, so perfectly in cleansing the bowels and expelling flatus that, after forty-eight hours, patient seemed convalescent, and it was considered a good opportunity to reduce his daily allowance of anodynes and attempt a cure of this pernicious habit. The system known as the "Soteria" was therefore instituted, and was maintained with difficulty and great opposition on the part of patient from the 20th of May to the 2d of June, and was fairly successful, but on that date the colicky symptoms returned, and no treatment seemed to overcome the obstinate constipation, the pains, now that no anodynes were given, being excruciating and the stomach very irritable.

On the 12th of June he was extremely weak and suffering from singultus; on the 13th, nauseated, abdomen swollen and tympanitic over ascending and transverse colon; and in the evening of that day and on the morning of the 14th there was stercoraceous vomiting. The absence of tympanitis over the descending colon showed the obstruction to be at the point where the transverse colon becomes the descending, the originally located seat of trouble, and an operation seemed to be imperatively demanded. So, after consultation with my medical associates of the hospital and station, it was determined to operate without delay. In preparation for the operation, morphia was hypodermatically given before the administration of the anaesthetic, and when well under the influence of the latter an exploratory laporotomy was performed. The details of the operation are not necessary, but suffice it to say that, although the gut was found to be held by bands of organized lymph at the seat of pain, no stricture could be demonstrated; so an artificial anus was formed and the abdomen closed, after thorough antiseptic cleansing. At the moment of concluding the operation, however, the patient suddenly developed symptoms of collapse, and, although every means was employed to revive him, he died on the table.

The revelations of the autopsy are of intense interest as illustrating the lengthy development and strange pathology of this case, and I quote the report in full, as made by P. A. Surg. George Rothganger, U. S. N.:

> All the intestines found to be distended except the descending colon, which was empty. At the point where the transverse became the descending colon the large intestine was adherent to the diaphragm, and, on dissection, the colon was found to project through a traumatic opening into the thoracic cavity, so, by the flexion and adhesion of the intestine, the caliber of the gut was almost obliterated. An old abscess was found in the erector spinæ muscle, with a posterior opening, which had completely disintegrated the muscle of the left side. The left lung was adherent throughout its entire extent, and the right in its upper portion, and small vomicæ were found in both lungs, with much tubercular deposit. The scar of the stab wound, the origin of all the trouble, was found low down, posteriorly, in the left axillary line, nearly corresponding to the opening in the diaphragm.

There is no doubt that the wound involved the erector spinæ muscle, the diaphragm, and sheath of the iliacus muscle, which, at first healing, subsequently reopened, permitting the purulent contents of the pleural cavity to penetrate the muscular substance of the erector spinæ and sheath of the iliacus, and, by distending pressure, enlarged the diaphragmatic opening, thus permitting a hernial protrusion into the chest.

I also add a reference to two successful cases of skin grafting by the method of Thiersch—one an extensive loss of tissue through phlegmonous erysipelas, the other a burn covering a wide area of the leg.

In my last report I indulged in some enthusiasm over the introduction of the new water supply from Green Valley. So far as quality is concerned there is nothing to be desired, but the pressure is inadequate to furnish it as freely as we desire for irrigation and fire purposes, or, as I had supposed, to reach our tower tanks without pumping, an expense I had hoped to have saved. As it is, the pressure at the hospital is no greater than under the old system, and pumping is demanded twice daily.

The reason of this inadequate pressure is in part due to the pipe from Fleming Hill distributing reservoir in Vallejo being tapped so frequently in its long course of 2 miles. When not thus drained, the pressure gauge at the foot of Georgia street wharf indicates 90 pounds, but from this point the submarine pipe conducting the water across Mare Island straits is obstructive, being but of 4-inch caliber and somewhat irregular in its course, which enters a 5-inch pipe at the yard water front, again connecting at house No. 14 with the 6-inch main, from which connection is made with the hospital system, the caliber of which is 4 inches. The varying pressure in Vallejo, the irregularities of the submarine pipe, with more or less interior roughness at its jointed connections, and the various calibers of pipe making the yard course to our reservation sufficiently explain the absence of proper force to meet the necessities of our hospital, failing in giving us a continuous abundant supply of water at all hours for irrigation and other purposes, and in case of fire no stream could be brought to bear as high as the third story.

To render the water system satisfactory, I am informed by competent authority that an independent cast-iron pipe with lead joints should be laid from Fleming Hill reservoir to Georgia street wharf, connecting with an 8-inch cast-iron submarine pipe, with ball joints, to the yard. The estimated cost is—

Pipe to Fleming Hill reservoir	$18,000
Labor for same	750
Submarine pipe	2,700
Labor for same	500
Total	21,950

A saving of one-half in the cost of the land pipe, it is thought, might be made by connecting with the main on Monterey street, which is outside the area of greatest local consumption in Vallejo. A similar exhibit has been made to the Bureau of Yards and Docks, I am informed, which Bureau has the matter under consideration, and I would earnestly urge that the Bureau of Medicine and Surgery cooperate with that of Yards and Docks in carrying out this obviously necessary arrangement.

My recommendation in regard to concreting the basement, or paving with artificial stone, having been approved, the work was contracted for with Mr. M. S. Wilds, of Vallejo, and satisfactorily completed on the 18th of November last. This embraced the whole basement hall, library, kitchen, and storerooms, which, with the previous pavement of the scale room and cellar, cover all the basement area save the sleeping apartments of the employees and the two dining rooms, where wooden flooring is obviously more desirable. Following the completion of this work, all the basement woodwork and walls have been thoroughly painted, and wooden and iron plates placed over the course of the pipes.

I trust I may be pardoned for again urging upon the Bureau the necessity for a removal of the carpenter shop from the apartment beneath ward 2, where the work constantly going on is a source of much annoyance to the patients. It is therefore respectfully suggested again that a shop be built in the ravine near the steam building, so that power can easily be introduced, and I append a design for the structure proposed. We have nearly a sufficient supply of lumber for its erection and also window sashes, but there will be required further—

12,000 shingles	$24.00
2,000 feet 8-inch "rustic"	48.00
1 keg wire shingle nails	3.50
1 keg 40d. nails	3.50
Total	79.00

The large door represented at the end of the design is to abut on a road descending into the ravine, and the other extremity faces the boiler room.

The contractor for the paving of the basement likewise completed the authorized repairs to the stable sewer, making perfect drainage and connection with the main sewer of the "yard" leading to the "tules." He also relaid or renewed all the brick of the hospital areas and reset or renewed those constituting the road borders.

Reference was made in my last report to the fitting up of certain rooms on the first floor of the hospital as "board" and "operating rooms." As a "board room" they have been very satisfactory, but as regards their other feature, having but little means at my disposal for putting them in the required state to meet modern demands for this purpose, I have not been entirely satisfied. All I could do was to resurrect and put in order an ancient table fitted with cumbersome brass adjustments, dating from the early days of the hospital, long stored away in the garret; to manufacture a stand for antiseptic solutions; to introduce a sink with hot and cold water, and cover the floor with linoleum.

It is desirable to have a small operating room built, and a convenient site would be in the rear of the hospital, near ward 2, or in the same relative position at the other extremity of the hall, near ward 1, where there are doors of exit; but if this is not considered feasible, I would recommend that the present operating room be fitted up in accordance with the plan adopted in modern hospitals with floors and walls tiled; also that electric lights especially adapted to the purpose be introduced, and that a simple modern operating table with glass bed be furnished. It is a room well lighted from the south, but should be furnished with convenient artificial illumination, one recent operation having been performed at night with much embarrassment owing to the absence of proper light. I have had an estimate made for this purpose which would make our operating room correspond in character to that of the recently erected French hospital in San Francisco, and that of the Lane Hospital now in process of change. The estimate is for—

Vitrified encaustic tile flooring and glazed tile wainscoting 3 feet high	$265
Operating table	65
Antiseptic chair, stools, and tables	35
Marble top to enameled sink	20
Change in lighting apparatus	10

I would also recommend—and preferably at the time of the proposed remodeling of the operating room—that the basement closets, closet wash rooms, and bathrooms of the four wards be floored and wainscoted with tiles in a similar manner. The estimated cost is—

For the basement	$75
For closets and wash rooms of wards (four)	245
For bathrooms of wards (four)	200

These changes are most essential for the closets, where the dribbling of urine causes chemical changes in the zinc flooring, which renders its appearance unsightly, and demands frequent renewal or repairs.

An elevator was placed in the hospital when erected, twenty-six years ago, furnished with a hoisting windlass, and worked by hand power. Such an apparatus is demanded, but this affair is too cumbrous, and is dangerous. I would recommend that hydraulic power be substituted for the present arrangement, and the expense of the change would not be very great.

The improvements to the hospital during the year comprise new enameled tubs (five) for the laundry; furniture, including folding bed, for one sick officer's room; new carpets for four rooms, including the reception parlor; rubber stair pads to complete the covering of the stairways to the third story; extensive repairs and reupholstering of furniture on hand, and self-closing door springs adapted to all the main doors of entrance to the wards. Some spring mattresses have been added to the fourth ward, and pictures have been hung on the walls of all the wards and officers' rooms. A new roller gate has also been erected at the stable and all the fences thoroughly repaired. Throughout the year the grounds and roads have received special care, gutters and drains have been put in or renovated where necessary, and the surfaces treated to additions of gravel, cinders, etc., resulting in a most excellent roadbed. The orchard has also received attention, and many choice fruit trees planted.

Finally, I would again call attention to my schedule of proposed increase of pay in my sanitary report for 1892, with my reasons therefor. Since that report an additional nurse has been authorized and appointed. The additional fireman, however, seems still to be required, and he could also perform much work as general laborer, the laboring force being inadequate to the care of the grounds. A mess attendant for sick officers is also a desirable addition, the scrubber at present performing this duty, a service which should not be demanded of him, as he is assiduously at work at all times on the halls, windows, and offices of this large building.

REPORT ON NAVAL HOSPITAL, YOKOHAMA, JAPAN.

By PAUL FITZSIMONS, *Surgeon, United States Navy.*

Only 51 cases were treated here during 1895, owing to the recent war and the necessity of keeping our men-of-war in Chinese ports. With the present force on the station, the hospital should be full the greater part of the year, as, with the exception of Chefoo, the only healthful ports are those of Japan, and of these Nagasaki should be excluded on account of its excessive heat and malaria. From the other ports the hospital is readily accessible. Although the number of patients has been limited, the resources of the place have been taxed the greater part of the year by caring for insane patients, and the length of time some remained made it quite a problem to secure the proper amount of exercise and sunlight. The war also caused several patients to be retained longer than otherwise would have been the case, from the inaccessibility of the vessels.

The late cholera epidemic was successfully combated by the Japanese, and it never assumed threatening proportions in Yokohama, although there were several cases daily for some months. The mortality was large, and it is possible that the authorities regarded the communities more than the individual. Details are omitted, as a special officer has been ordered to make a report, but I may say it speaks remarkably well for any country to bring back from abroad an army of 150,000 men with the same number of coolies, more or less infected, and after distributing them over a densely populated country of 40,000,000, to have as a result only about 59,000 cases of cholera. The disease may recur next year, but is now apparently stamped out, and there is at no time any fear of an epidemic, except in a few places where the water is bad.

During the past year the generally good appearance of the grounds and buildings have been kept up and some improvements made. The detached ward has been put in good order and compares very well with the others. The floor was taken up and relaid, the weatherboarding of the interior walls replaced by plaster and tinted, and all the woodwork, floor, ceiling, and rafters covered with three coats of paint.

The well gave out from the decay of the wooden tubs lining it. Everything was taken out to the solid clay and the upper 15 feet bricked. Advantage was taken of the opportunity to put the pump in as good order as its inherent defects permitted. Instead of being of gun metal, the plunger is wrapped, and when this needs repairing the mass of 200 pounds has to be lifted above the water. An iron roof has been put on the house and the brick platform cemented.

The cistern, of 15,000 gallons capacity, authorized by the Bureau, was completed early in the year. It has been full to its utmost capacity, and as it has passed through several earthquakes, its solidity is assured. Attached to it is a small, fixed pump, easily worked by the hospital force, throwing a stream of water vertically 70 feet through a quarter-inch nozzle and discharging 45 gallons per minute through a half-inch nozzle. By authority of the Bureau, a house was put up and the Yokohama fire brigade allowed, under written restrictions, to store a large engine on the premises. It requires 30 men to work it properly, and double the number can be obtained in a few minutes from an adjacent station of the fire brigade and from a police station near by, which is also a fire patrol. The advantages of the cistern are great, when it is understood that the large foreign quarter depends on wells, and that none of them have available for fire purposes more than a few hundred gallons of water. The city has a good water supply in the "settlement," but it is too far to be of the slightest use on the "bluff."

REPORTS ON UNITED STATES NAVY-YARDS AND STATIONS.

REPORT ON UNITED STATES NAVY-YARD, BOSTON, MASS.

By FRANKLIN ROGERS, *Surgeon, United States Navy.*

Of the 41 patients invalided to hospital, 14 were for venereal diseases and 6 for alcoholismus—almost 50 per cent.

Of the 137 cases admitted, 50 were ascribed to climatic causes. Two cases of tuberculosis pneumonica acuta were invalided to hospital, and are considered to have originated from causes incident to barrack life. One had been here four years and the other a little over one year; both did duty confining them much of the time indoors.

A single case of catarrhus epidemicus, of mild type, was admitted early in the year.

No infectious diseases have presented during the period covered by this report other than those mentioned, except a case of morbilli, occurring on the Coast-Survey steamer *Eagre.*

Injuries to workmen have been few, and none of a serious nature.

Vaccination statistics for the year are as follows:

	Number vaccinated.	Successful.
First quarter	28	5
Second quarter	11	1
Third quarter	86	12
Fourth quarter	47	22
Total	172	40

Percentage of success, 23. Primary vaccinations were all successful. The large number of successful vaccinations of the fourth quarter is attributed to the quality of the virus then used, and not to the greater susceptibility of the persons vaccinated.

The absence of means, excepting doors and windows, whereby the various apartments of the marine barracks can be ventilated, is as marked now as it was a year ago. No matter how zealous those in authority may be to utilize the means at hand, they are not available in cold weather, when the members of the guard occupy their quarters, by reason of drafts instantly created and dangerous to health.

How to provide efficient means to properly ventilate these barracks without creating dangerous drafts, is an engineering problem. The contemplated addition of another story to the building will not solve it.

The cubic space per man is only 396 feet, without deducting space occupied by beds and men. This amount of space is too small. It surely should not be less than 600 feet in a well-ventilated barracks.

The double bunk is still in vogue at these barracks; a very objectionable feature for many reasons, particularly as the ceilings are very low in the sleeping quarters.

Attention is also called to the location and character of the water-closet used by the members of the guard. This room contains nine hoppers and one urinal, is lighted by a small fan light over the doorway opening to the courtyard and small sash light in the door. It, with the wash room and cookroom, occupy the ground floor of the building, forming the northern side of the court, and all open into this covered space.

The room is without means of ventilation except by open doorway connecting with the court and an opening just below the ceiling, about 1 by 3 feet in area, communicating with the wash room. This room communicates with the cookroom by two openings of about 2 by 4 feet in area. This cookroom communicates with the mess room by open doorway, and by two openings similarly placed and of about same area as last mentioned between cook and wash rooms. From the foregoing it is apparent that the emanations from the water-closet have uninterrupted access at all times to the mess room and courtyard, these being the only directions in which they can escape.

This state of affairs can be remedied by changes in the closet room, such as closing the openings into the wash room, by extending a shaft from the ceiling to several feet beyond the roof of the building, and by a double door arrangement to permit escape of closet odors, etc., into the courtyard. Additional openings to furnish light and air will also be necessary. These changes should be made, as from the courtyard entrance is had to storerooms, carpenter shop, boiler room in the cellar, and the bakery which it is proposed to install in the cellar under the southern end of the main building. Windows of domitories also open on this space.

At present the floor of the court is of brick, and this should be corrected by covering it with waterproof cement. The present flooring is much of the time wet and all of the time damp from retained moisture in the brick and sand underneath.

I have mentioned these matters in detail to emphasize the necessity for their correction so far as is possible in these old buildings.

The electric light should also be introduced into the barracks for obvious reasons.

In the prison both rooms wherein are located the baths, wash basins, closets, and dumps communicate by open doorways with the prison rooms proper.

The only means of ventilating these two rooms is by windows, and in cold weather this means the escape of the vitiated air into the prison.

Ventilating shafts should be introduced into these rooms and communication with prison rooms be cut off by double doors with air space between.

Ventilation of the prison is by a door and windows. To these must be added the large chimney that communicates by a capacious opening with the lower floor and extends well beyond the roof. These means are adequate in mild but not in cold weather, as open windows are objectional for reasons well known.

Methods should be devised for admitting fresh air without subjecting the inmates to dangerous drafts.

It will not be difficult to improve the ventilation of this institution, but to make it what it should be will require considerable change and involve proportionate expense.

The cells on the lower floor should be changed to the extent of having the grating extended to the floor along the front of all the cells. By making this change they will be greatly improved in the matter of ventilation and lighting.

At present these inclosures are simply boxes, minus tops, about 8 feet deep, and are dark and inadequately ventilated. The inner row of cells on this floor should be used for very short periods of incarceration only.

No case of serious illness has occurred among the inmates of the prison for the past year. Some of them are anæmic, as is to be expected under the circumstances.

The addition of extra police duty to sentences is a boon to all, and the opportunity to get into sunlight and fresh air is eagerly embraced.

The subject of suitable clothing for the prisoners while at outdoor work at this time of year requires attention. The marines confined here are amply provided, but prisoners of the Navy are not. These men are sentenced to extra police duties, and this necessitates exposure to cold weather in this latitude. Waterproof boots, caps with ear flaps, and gloves should be furnished these men, as is the case with their fellow prisoners of the Marine Corps.

I mention the building wherein is located the dispensary, etc., simply to call attention to the fact that its present status is, apparently, that of years, and has been oft referred to in previous reports concerning this yard.

The cellar under the stable calls for immediate attention, and the changes and repairs necessary should be made before warm weather sets in. Its present condition and unsavory contents are a constant menace to the health of the inmates of the near-by prison. The size of the space under the building devoted to the storing of manure, etc., before removal should be diminished to dimensions necessary for this purpose only, and the space so diminished be walled in, floor and sides cemented and drained, and ventilating shafts put in place, thus reducing the nuisance to a minimum.

The flooring above should also be water-tight and drained, so that as little fluid as possible will enter the cellar and also prevent the effluvia from below escaping into the stable.

In the matter of drains and sewers changes are impending, such as connecting with the metropolitan system, etc. When these connections and changes are made it is to be hoped that masons' traps, wooden drains, mixed drains, blind drains, drains discharging in timber docks, ship house, and spar sheds and slips will be abolished, as all of these are in existence here at present.

Exhausting steam into sewers should also be discontinued.

Surgeon Neilson, in his report for 1894, calls attention to the importance of an intramural water-closet for use of the men employed in buildings 40 and 42. The necessity is as urgent now as then, and should be attended to on the score of the physical well-being of the men employed in these great buildings.

REPORT ON UNITED STATES NAVY-YARD, NEW YORK.

By A. F. PRICE, *Medical Inspector, United States Navy.*

Since I reported for duty at this yard, on September 16 of this year, the hygienic condition of the yard itself and of the houses situated in it has been satisfactory. There has been but little sickness. One case of typhoid fever was treated at the officers' quarters, marine barracks. The patient was the mother of a marine officer, and the disease was in all probability contracted somewhere outside of the yard. The fever was of a mild type, and seemed to be benefited by the use of the chlorine treatment of Dr. Yeo. No other case occurred. One case of measles was treated.

The office of the medical inspector, including dispensary and storeroom, is in a more satisfactory condition, owing to the removal of the steam-heating boiler and the coal to a separate building adjoining building No. 1. From this boiler steam is also supplied to this office and dispensary. The supply of heat thus obtained was found to be insufficient. Two stoves are about to be put up to supplement the heat supply, which it is hoped will prove satisfactory.

There is appended a list of accidents and injuries that have occurred to the employees in the yard during the past year. They received the treatment required by the emergency.

The list is as follows:

Vulnus laceratum	25	Congelatio	4
Vulnus contusum	23	Heart failure	1
Vulnus punctum	2	Insolatio	1
Vulnus incisum	2	Abrasio	2
Contusio	13	Ambustio	1
Stremma	5	Fractura	2
Vertigo	4		
Colica	1	Total	86

REPORT ON UNITED STATES NAVY-YARD, LEAGUE ISLAND, PA.

By WILLIAM H. RUSH, *Surgeon, United States Navy.*

During the past year very few changes have been made in this yard. The total area of the yard is 923 acres. The area now occupied is 87.2 acres. So far 119.5 acres have been filled in with dredgings from the Delaware River. The filling in is now going forward upon the region in the neighborhood of the carp pond.

DRAINAGE.

The general drainage of the island remains the same, and is through large terra-cotta pipes placed beneath the surface. As the fall in the drains is not great, a large tank has been placed at the head of the main sewer for flushing purposes. The houses used as residences have each a separate system.

LIGHTING.

The yard is very poorly lighted, and after sundown, from the unevenness of the surface, accidents are liable to occur. A plant has been put in for lighting the yard with electricity, but it remains in disuse owing to lack of funds in the department of yards and docks for the necessary running expenses.

SIDEWALKS.

The greater portion of the old sidewalks, consisting of paving bricks, has been removed and a *cindolithic* pavement laid, which will prevent many cases of acute illness by keeping dry the foot apparel of those constantly on duty or of those passing from building to building.

WATER SUPPLY.

There is no sufficient source of pure water supply for this yard. At present for drinking and cooking purposes rain water is used, and in seasons of little rain great economy is required in its use. For flushing and other cleaning purposes Delaware River water is supplied. The latter is daily pumped into a large tank in the attics of the houses. The use of this water without proper filtration is unsanitary. The tanks are wooden, unlined, and leak at the joints, and are intentionally overflowed in order to fill an iron tank alongside of the houses, used for outdoor purposes, so that in the large leaden troughs under the tanks there is more or less water evaporating, augmenting that from the exposed surface of the tanks. Two cases of sickness among the servants have originated in House C, which I attribute to this source. The first proved to be an obstinate case in which diarrhea was the most prominent symptom, compelling the servant to cease labor and go to the city; all further record of this case was therefore lost. The second was sent to a civil hospital, where it developed into typhoid fever. Inquiry and rumor have shown the existence of diarrheal affections among the workmen employed on the pumps along the river front, who are compelled to use the rain water for all purposes. Cases of typhoid fever have developed among them. This all proves the necessity for hurrying forward the work upon the artesian well for which money was appropriated at the last session of Congress.

AMBULANCE.

There is no proper conveyance here for the transportation of the very sick to the naval hospital or to civil hospitals in cases of serious injury to an employee. The wagon used is very like an express wagon, with two seats arranged along the sides and a partition, partly glass, in front. Some years ago an ambulance was purchased, but it is too heavy and requires two horses, which can not be spared from the limited number allowed this yard. A small, light-running ambulance for one horse, similar to those used by the civil hospitals of the city, should be provided.

RESIDENCES.

House A is to be thoroughly overhauled. Houses B and C since last report have had a drain put in to carry off the water from the cellars, and the floors of those portions have been regraded with cement. Since this work has been done no water has accumulated in the cellars. The walls and ceilings in the second story of these houses remain unpapered and now present a blotched and unsightly appearance from the soot deposited upon them from the coal-oil burning lamps. The blotched appearance was intensified lately by repairing and filling where the plastering was cracked or broken.

My experience has coincided with that of previous medical officers who have occupied House C—that it is an extremely cold and uncomfortable house in midwinter, especially when the cold is accompanied by high winds. This condition is especially marked upon the first floor. With a view to improve the comfort of that portion, I made a written request to the commandant to have the porches inclosed with glass sashes, so as to break the force of the wind against the main portions of the house, and to have a stratum of partially heated air around nearly three-fourths of the house. This was not granted, owing to lack of funds allowed this yard.

The houses are still lighted at night by coal oil, which is, of course, relatively dangerous. Fixtures for incandescent lighting are now in place.

MARINE BARRACKS.

These are situated at the entrance gate to the yard, and as they border upon the low marshy land of "the neck," or ground outside the yard and lying between it and the city, are in a very unhealthy position. They have been built upon no regular plan, but additions made from time to time as small amounts of money were available. There are two main rooms used for sleeping purposes, No. 1 being 90 feet long, 24 feet wide, and 10½ feet high, giving only 504 cubic feet per man; No. 2 is 100 feet long, 24 feet wide, and 10½ feet high, giving 629.3 cubic feet of air space per man.

The water-closets and urinals are in a small building separated from the others, and are clean and well drained into the back channel.

The wards are well lighted by windows opposite to one another, and are heated by large stoves. Coal oil is used as the source of light at night.

Notwithstanding the limited amount of air space from overcrowding and the location of the barracks, the health of the post remains remarkably good.

The best position for the new barracks recommended to be built by the commandant of the Marine Corps, as far as health is concerned, would be on the Delaware River front, on the western end of the island.

DISPENSARY.

The interior woodwork needs painting, and the walls either painting (which is preferable) or papering. There should be some source of constant heat in winter to avoid freezing and consequent deterioration of medicines and the continual loss from freezing of watery solutions, etc., causing breakage of bottles. The antiseptic outfit in the case has been entirely destroyed by such an accident. The carpets are worn threadbare, are badly torn, and present a very bad appearance.

THE POPULATION.

The resident population of the island consists of several families connected with the yards and light-house service, and are as follows:

Three resident officers and families	17
Three employees and families	11
One light-house keeper and family	9
Marines at barracks	92
Civil employees on pumps, etc	25
Total	154

To this should be added the floating population of civil employees of the yard who are present during the working hours of the day. The floating population is:

Nonresident officers	15
Civil employees in yard	200
Total	215

Making a total resident and nonresident population of 369.

There are frequent demands for medical assistance from such a large number of people. The number of sick days for each quarter of the year is as follows:

First quarter	44
Second quarter	50
Third quarter	101
Fourth quarter	36
Total	231

The number of cases transferred to the naval hospital was 20.

A review of the yearly abstract shows five cases of malarial fever, only one of which could be considered as originating on the island. With the completion of the filling in of the low portions of the island and the necessary buildings erected, malarial fever will cease to be the bane of the station.

REPORT ON UNITED STATES NAVY-YARD, WASHINGTON, D. C.

By JOHN C. WISE, *Medical Inspector, United States Navy.*

Since the last report was rendered the Sixth-street sewer has been extended to deep water; the work has been substantially done, and all causes of complaint from this source effectually remedied. A wall of solid masonry has been built on the western limit of the yard, separating it from the square south of M and east of Fifth street. This property is now being filled in and will, when completed, add to the salubrity of the yard. The sewer on Ninth street remains in the same unsatisfactory condition as hitherto reported. A large area in the southwestern part of the yard has been reclaimed and low places generally raised and drained.

A sanitary board, ordered by the Department during the year 1895, recommended the burning of all garbage and connection of yard sewers with the city sewers outside. The first recommendation has been carried out, but the second was impracticable, on account of the difference in level.

A much-felt need is a properly constructed and sanitary prison, the cells in the marine barracks being insufficient for this purpose.

During the summer and fall an epidemic of malarial fever prevailed here, which was widespread and of a severe form, most cases being of continued or remittent type.

One hundred per cent of the seamen and about 80 per cent of the marines and six officers, residents of the yard, were attacked during the summer.

In obedience to orders from the Department, a detailed report on the cause of this epidemic was submitted, under date of September 23, 1895. The conditions giving rise to this epidemic have long existed, and attention has been called to them in the sanitary reports from this office. Surg. C. W. Gravatt, of the U. S. R. S. *Dale*, submitted a report to the Bureau in 1894 calling attention to the regular increase of malarial fever on that vessel and at this yard, which is due, undoubtedly, to the mud flats of the Anacostia River, accentuated by the intense heat of the summer. The improvements to the river have been such as to contribute greatly to this insalubrious condition. Mud bars have been thrown up to intercept the tide and fill up the flats. Thus an immense amount of organic vegetable matter has been exposed, generating malaria on a large scale.

In addition to this there have been large deposits on the flats of insoluble sewage, which has greatly added to ill health. James Creek, which empties into the Anacostia River, is nothing more than a most unsanitary sewer, its bottom exposed at every low tide, being covered with decaying organic matter, both animal and vegetable.

There were 250 admissions and 48 readmissions to the sick list. Of this number, 216 returned to duty and 79 were transferred to hospital. There was a loss of one thousand and twenty-one days from sickness, due principally to the large number of cases of malarial fever.

Febris remittens.

	First quarter.	Second quarter.	Third quarter.	Fourth quarter.
Admitted	1	1	71	18
Readmitted			4	28

Febris intermittens.

	First quarter.	Second quarter.	Third quarter.	Fourth quarter.
Admitted	8	9	43	11
Readmitted	2		4	9

The services rendered workmen at the yard embraced 56 surgical cases, viz:

Incised wounds	13	Contused wounds	19
Lacerated wounds	16	Fractures	2
Burn	1	Sprains	2
Cases necessitating amputation	3		

Two deaths occurred among the employees, one from fracture of the skull and one from heart failure.

REPORT ON UNITED STATES NAVY-YARD, NORFOLK, VA.

By N. M. Ferebee, *Surgeon, United States Navy.*

During the past year the health record has been rather better than in the preceding two. The total number of sick days was 392 against 526 for 1894. Of the 39 transferred to hospital, 14 had venereal diseases. That this number is 5 smaller than last year is probably due to the decrease in the strength of the guard.

For enlistment in the Marine Corps, 88 candidates were examined. Of these, 55 were accepted.

The number of injuries received by workmen in the yard and recorded was 46. The number of prescriptions for yard workmen was large, due to the fact that there seems to be a growing belief among them that they are entitled to treatment by the medical officer and to medicines from the yard dispensary. The constipation of a week, and the stomach-ache or headache due to Saturday night's imprudence in food or drink, are endured until relief can be sought at the yard dispensary during working hours on Monday. These requests must necessarily be much more numerous than humanity can permit the refusals to be.

The defect in the arrangement of the sewers at the marine barracks noted in a previous report has been remedied in accordance with the plan recommended by the board appointed to investigate it. No further trouble has occurred.

The water obtained from the driven wells has not proved suitable for drinking purposes, owing to the excess of chloride of sodium.

REPORT ON UNITED STATES NAVY-YARD, PENSACOLA, FLA.

By J. Shirley Hope, *Passed Assistant Surgeon, United States Navy.*

The sanitary condition of the yard is good, and the health of the officers, enlisted men, and employees has been excellent. The yearly abstract of patients shows the total number of admissions to have been 4, furnishing fifty-three sick days—tonsillitis, 6 days; bronchitis acuta, 14; ambustio ex calore, 21; catarrhus intestinalis acutus, 12. All were discharged to duty.

Alterations or repairs have been made to the quarters of the commandant, the paymaster, and the ordnance officer, whereby the houses have been made more comfortable than heretofore. Hot water for bathing purposes is now to be had in the two latter houses. Such an essential element to health and comfort should be plentifully supplied to the quarters of all officers.

The wells sunk by the Department of Yards and Docks have entirely failed to supply potable water, and all wells have been abandoned for this purpose and are now used for fire purposes only.

The total number of deaths occurring on the reservation during the year was 27. The certified causes were: Consumption, 6; tetanus, 3; pernicious malaria, 3; heart disease, 3; paralysis, 2; old age, 2; whooping cough, asphyxia, entero-colitis, and stillborn, 1 each; lobular pneumonia, 2; and cancer, 2.

A note of interest is the fact that not one case of typhoid fever originated on the reservation during the year. I attribute this to the almost universal use of cistern water, and to the plentiful rainfall during the summer and fall months. The number of malarial diseases has markedly decreased in comparison with former years. It is the unanimous opinion of the medical practitioners here that this fact is due to the use of cistern water, in lieu of drinking the surface well water. There have been four cases of pernicious malaria treated. Three of these died. In one of the cases the abdominal symptoms so closely simulated those seen in typhoid that a positive diagnosis was not made until Laveran's plasmodium was demonstrated in the freshly-drawn blood. The temperature chart aided in excluding typhoid, but it has been my observation that temperature alone is not to be depended upon for an absolute diagnosis in a case of typhoid in malarial districts. This special case was almost undoubtedly due to the fact that the individual drank water from the Commodore's Pond—a partly stagnant body of fresh water reeking with vegetable organisms.

It is my opinion that the cause of malarial diseases in this locality is the inadequate surface drainage. A drain running from near the hospital and emptying near the navy-yard wall is the only means of draining the greater part of Warrington. This drain has several cross outlets, but they avail little for the purpose for which they were intended. Warrington is but a few feet above the level of the bay, and water is dammed back in the drain. Sand bars form at the outlet and keep the water back, making it stagnant for weeks at a time. I do not believe that this state of affairs can be obviated unless earthen drains be laid and water be supplied for frequent flushing.

Several ships with suspected cases of yellow fever entered the port of Pensacola during the summer. With the very excellent quarantine station, and the means at hand, I believe it to be next to impossible for this dread malady to again enter Pensacola or this reservation.

An epidemic of dengue fever made its appearance on the reservation in the early fall. The individual cases responded quickly to treatment.

REPORT ON UNITED STATES NAVY-YARD, MARE ISLAND, CAL.

By Surgs. GEORGE P. BRADLEY and J. R. WAGGENER, *United States Navy.*

[Report by Surg. G. P. Bradley.]

My experience of this locality having now extended through the various seasons of the year, I may venture to offer a few remarks, the result of observation, upon the climatic features of the navy-yard and the forms of diseases most to be expected.

As heretofore stated in various reports, the average yearly rainfall is slight, perhaps not over 25 inches, and this, though not so absolutely restricted to certain months as the terms "rainy" and "dry" season would imply (for residents have informed me that rain has fallen in every month of the year within their knowledge), occurs mainly from November to March. The use of irrigation in the yard, with the abundant timber, shrubbery, and ferns planted within the past twenty five years, has doubtless modified climatic conditions somewhat, and for the better.

The soil being adobe on the surface, with a substratum of shelly sand, the ground is for the greater part of the year dry, and readily absorbs any organic moisture. A great difference exists between the atmospheric conditions of this place and those of San Francisco, some 25 miles distant. Here, owing to the inland position, and a separation from the sea by San Pablo Bay and a broad expanse of mountainous country, the cold winds and sea fogs which render San Francisco so uncomfortable are lacking. The temperature is moderate the year through, and even the dryness of the air impresses one accustomed to eastern tide-water localities. On the whole, the climatic conditions appear extremely favorable, and the causes of disease are avoidable. Perhaps the most serious question is whether this island generates the malarial miasm de novo. A long residence has induced me to suspend my judgment on this point, though at first I was clearly of opinion that the malarial poison did not originate here.

It is hardly necessary to point out that with a population, both military and civilian, mostly subject to attacks of malaria elsewhere contracted, a certain prevalence of malarial diseases may be expected. In the case of marines on night post, or subject to similar exposure, several attacks have been severe, approximating to the pernicious. As I have elsewhere stated, this was very obvious last year in the men returned from Sacramento (on the strike duty of July, 1894), and several of the best men and noncommissioned officers have figured largely on the sick list from paroxyms which, however brief, have been very marked. Some have been apparently cured by the use of arsenic, administered in freshly prepared pills with extract of taraxacum or gentian, in doses of one-fifteenth to one-tenth of a grain twice a day, night and morning. This detail is mentioned, because I believe it is contrary to the usual practice where arsenic is given in solution and with food.

Attacks of malarial contracted elsewhere may be a cause of error in expressing an opinion on the question whether Mare Island is malarious. According to the very long observation of at least one medical officer, it is not; yet I have seen several cases, where previous attacks were denied, occurring after some special exposure. I think it safe to say, at any rate, that it is freer from malaria than any of our naval stations south of Boston.

The formal statistics of disease at this yard are limited to the marine barracks and to officers on duty; but as the families of officers and certain civil employees residing here furnish no inconsiderable proportion of professional work, they should be made use of in an estimate of local diseases. The simultaneous prevalence of certain affections among the enlisted men and persons so widely different in surroundings and habits of life is often useful where questions arise of local and preventable causes.

In the reports for the latter part of the third and beginning of the fourth quarter of this year will be noticed an unusually large number of cases of diarrhea (simplex) which, in the very doubtful hygienic condition of the barracks, naturally gave rise to suspicion; but it seems certain that they were due to exposure to cold. Many of the patients were recruits, who failed to provide themselves with sufficient underclothing or to make use of it at a season when, with hot days, the nights begin to grow cooler and occasional transient showers preceded the autumnal and winter rains. With the removal of the cause, the cases ceased, and while for the first fifteen days of October the "total number of sick days" was large (seventy-eight), the average since then has been as small as usual.

There has been nothing noteworthy in the way of other affections, the class of infectious and contagious diseases being almost unrepresented. One rather peculiar exception occurred in the case of a marine, enlisted on the 2d of October, admitted to the sick list on the 13th, and transferred to the hospital on the 15th. This man, young and strong, after admission to the sick list, in the morning complained only of a little diarrhea, which had existed two or three days. His temperature was not high, but at night it was 105°, and so remained or higher, uninfluenced by quinine and other remedies. He presented the characteristics of pernicious fever, and died several days after his transfer to the hospital without any marked remission having occurred. The autopsy disclosed signs of typhoid fever, though the stage of ulceration or perforation did not exist. As in my own experience of typhoid fever occurring in the Navy, it is usually complicated with and often masked by symptoms of malaria, I can not doubt that the actual cause of death in this case was the malarial element. No other case of typhoid has occurred in the barracks. If, as is conjectured, the seeds of this disease were sown prior to the man's enlistment, they remained latent a very long time. Yet unless we admit that Peyer's and the mesenteric glands may be affected otherwise than in this affection its existence can not be doubted.

The outbreak of cholera in Honolulu seems fortunately to have subsided there without reaching this coast, but the danger was so apparent and the possibility of its recurrence is so great as to make it necessary to reiterate more forcibly the warnings already on record in regard to the extremely insanitary condition of some portions of this yard, and more particularly of that part known as "Dublin," the quarters of certain civil employees. In the absence of any authority to inspect private premises, and also in view of the fact that such inspection has been made and reported, I will only say that the conditions there are practically unchanged. A hole or "cesspool" is dug and a privy house placed over it. When the "pool" is filled it is covered up, disinfectants, it is said, having been thrown in, and another dug. The old hospital with its choked up board sewer still exists, and I am informed that drainage from the upper story still goes into it to be retained in the soil. It is, in my opinion, absolutely impossible that this system can be much longer persisted in without serious consequences to health, even if no special epidemic disease arrives.

In case of such an invasion as was reasonably apprehended this year, the result will be calamitous, as has been seen on the large scale in the case of Buenos Ayres, where the soaking of the ground with the excrement was practiced in exactly the same manner. I consider this particular matter of so much importance that I suggest immediate action. As any improvement in this locality will probably call for a considerable outlay of money, I think a board of officers, one of whom should be qualified to discuss the problem in civil engineering involved, might well be appointed. If, owing to the slope of the ground, etc., a thorough system of sewerage with a sufficiently large pipe to carry all drainage to tide water can not be devised, in regard to which I do not feel qualified to express an opinion, the only alternative is, as suggested by Surgeon Moore, an earth-closet system. This would necessitate the most careful and constant inspection and removal, which would be even more difficult and expensive. Judging from the previous reports and from statements made here, I agree with Surgeon Moore that the old hospital building itself ought to be demolished.

The lack of any place in this yard where disinfection of clothing and other articles can be performed has already on one occasion proved a serious inconvenience. When the *Olympia*, during her stay here, received a draft of men with their effects, who arrived on a Pacific mail steamer on which smallpox had occurred, the necessary fumigation had to be done on board the ship. It is suggested that a small edifice be erected, sufficiently near the water front to be easily accessible, yet isolated from the buildings, and supplied with the usual appliances for the production of dry steam heat.

[Report by Surg. J. R. Waggener.]

A sanitary report covering the greater part of the year (to November 16, 1895) was made by my predecessor, Surg. G. P. Bradley, a copy of which I forward herewith. In consideration of the fact that this report covers so much of the ground I will limit myself to the following subjects:

1. The storehouse, dispensary, and surgeon's office.
2. The sewerage of the yard.

MEDICINE AND SURGERY STOREHOUSE, DISPENSARY, SURGEON'S OFFICE.

The space allotted to the medical department is in equipment building, partitioned off from the rigging loft. It is divided into medicine and surgery storehouse, dispensary, and surgeon's office.

MEDICINE AND SURGERY STOREHOUSE.

The space used as storehouse has been divided into two stories by a temporary floor. This floor cuts the windows in half and shuts out most of the light. The storerooms are therefore dark and close. There is not enough room for the proper arrangement and care of the property kept on hand for distribution. Stores received from ships going out of commission must be kept apart from the general stock until surveyed, and a separate room is needed for this purpose. As it is, these stores remain on the tables and floor subject to loss and breakage while awaiting action of a board of survey. They may remain thus over two months, as surveys are held only once a quarter. The stores from several ships sometimes accumulate in this way and greatly obstruct the work of the Department. The place is damp, causing injury to surgical instruments and appliances. The entrance is through the rigging loft, through which stores received or sent out must pass over piles of cordage and other obstructions.

DISPENSARY.

The dispensary is too small. It is overcrowded, dark, and ill ventilated. In the absence of other accommodations it must be used for too many purposes. Such dressing of wounds and surgical operations as the frequent accidents among the workmen call for must be done there. It is wholly unsuited for this work. The books and other records of the medicine and surgery storehouse must be prepared and kept there exposed in many ways to injury.

THE SURGEON'S OFFICE.

The surgeon's office is one only in name. It is a closet about 13 feet long by 9 feet wide. It contains a bookcase, case for medical periodicals, desk, chair, and table. The space left is limited. The light is so badly arranged that to write or read there any length of time is impossible without injury to the eyes. It is not suited for any of the uses of a surgeon's office.

RECOMMENDATION.

In view of these facts it is recommended that some other quarters be provided for the medical department. There is no space available in any other building and that which we occupy now is needed by equipment. The work in the yard has increased and is still increasing. The importance of the yard as a distributing center for medical supplies has also increased. The need of a new building exclusively for the use of the medical department is imperative. A plan for such a building has been made by the civil engineer of the yard (plan No. 1026). He will submit it, I understand, with his annual report. With some modification of internal arrangement the proposed building will supply all that is needed. It will contain also quarters for the apothecary, a very desirable thing, as his duties require him to live in the yard. The old hospital building, where he now lives, is unfit for habitation. (See the report of Surgeon Bradley.)

SEWERAGE.

To put the sewerage of the yard in a thoroughly good condition would be a work of some magnitude. The system of repairing a little here and putting in a new drain there, which has been pursued for years, has created such a state of confusion and disorder that, I believe, nothing less than the laying of an entire new line of pipes with new house connections would be efficient. Such a work should not be undertaken until after investigation and report by a board of experts. I respectfully recommend that such a board be appointed and the sewer system be brought up to the latest standard of sanitary science.

I will mention some of the most apparent defects of the sewerage and suggest such remedies in each case as upon consultation with the civil engineer of the yard I think would be most useful in default of an entirely new system, as recommended above.

(*a*) The drainage gratings along Central street open directly into the main sewer, permitting the escape of sewer gas and offensive odors. They should be trapped.

(*b*) The main sewer empties a short distance below the gatehouse. The discharges are washed on the mud slope and become at times very offensive. This condition could be remedied by extending the sewer farther into tide water.

(*c*) The main sewer on Tamalpais street is often obstructed by the growth into it of the roots of trees. It has been necessary on this account to dig up portions of the sewer a number of times during the past few years at considerable expense. This blocking up of the sewer and its disuse consequent upon repairs are a source of great inconvenience, if of nothing worse, in the houses whose water-closet drainage empties into it. This would be remedied if the present terra cotta sewer with frequent joints were replaced by a galvanized and asphalted iron pipe with proper manholes.

(*d*) The sewers are flushed at intervals, but the primitive method used, water carts and hose, can not be very efficient. An automatic flushing apparatus was begun some years ago, designed to flush the whole sewer system with water pumped from the bay by wind power. It has never been completed. This might be effective if finished and properly connected with the sewers.

(*e*) There are no sewers in that part of the yard occupied by civil employees and known as "Dublin." In order to put this section in good sanitary condition a complete system of sewers should be laid there, with which the owners of the houses should be obliged to connect.

(*f*) The ventilating pipe for water-closet and bathroom drains in some houses reaches only to the third story, allowing the escaping gas to be blown into the sleeping rooms when the windows are open. The pipes should be carried above the tops of the houses.

In connection with this subject I recommend that a water-closet be placed in the gatehouse. There is at present no convenience of that kind there. One could be put in the south corner of the building at little expense, the sewer passing close by.

REPORT ON UNITED STATES NAVAL STATION, NEW LONDON, CONN.

By CLEMENT BIDDLE, *Surgeon, United States Navy.*

There are on duty or employed at this station three commissioned officers, also one secretary, one paymaster's clerk, five enlisted men, and twelve civilian employees. Of the officers and their families one resides here permanently and one six months in the year. None of the civil employees or enlisted men live on the Government land, though a number are located very close to it. These facts are given in detail in order to make clear what number of people are exposed to any unhygienic conditions that may exist here.

The extent and situation of the Government reservation having been described in previous reports, it is deemed unnecessary to repeat the data relating thereto, except to allude to the fact that the station is adjacent to and touched by salt and fresh water marshes. Hitherto sufficient stress has not been laid upon this point, which has so direct a bearing on the health of this place.

I would particularly call attention to a shallow, tidal, salt-water inlet, known as Long Cove, located about a half mile from the northern boundary, to the marshy littoral extending along almost the entire water front on the Thames River, and to a fresh-water marshy pond close to the southeastern boundary, the latter reeking with decaying vegetable matter during the spring, summer, and autumn. It would be difficult to find a spot more surrounded by paludal influences than this.

Since my tenure of duty began the only prevailing disease has been some form of malaria, and of this there have been many cases, due, without the shadow of doubt, to the miasmatic germs emanating from the paludous spots by which this station is hemmed in.

As regards character of attacks, some were mild, yielding readily to a few doses of quinine, while others proved obstinate, continuing from day to day, and apparently not at all controlled by the usual treatment. Even so late as December ague has prevailed at this station, and of all the people residing on or near the station or of those remaining only through the day but few have escaped an attack of ague.

Upon this station there are three houses provided for the occupation of officers. The sewage from these flows in pipes by gravity into the Thames River. In each house the water-closets are trapped and ventilated and no complaint has come to my notice regarding any bad odors emanating therefrom. A system of sewerage has never been laid down upon the Government land.

I append here an analysis of the water made by me derived from six different sources found upon the station, with comment as to location of well, source of supply and potability:

Water, House C, commandant's (well).—Color, faintly grayish; clearness, hazy; sediment, decided, reddish brown (see below); taste, faintly saline; smell, none; reaction, neutral; chlorine, marked precipitate with Ag NO_3; lime, marked turbidity with ammonium oxalate (solution); iron, none—either ferrous or ferric; hardness, permanently and decidedly hard (Clark's soap test); organic matter, permanganate gr. ½ to ℥i, gtt. v of this solution were readily decolorized by a test tube of the suspected water; sediment (microscope), reddish vegetable matter. This water is not fit for drinking purposes.

Well, House A, surgeon's house.—Color, faintly bluish; clearness, clear; sediment, none; taste, excellent; reaction, neutral; chlorine, none, with Ag NO_3; lime, none, with ammonium oxalate; iron, none, with potassium chromate; hardness, none, with Clark's test; organic matter, none, with permanganate. Is used daily for drinking purposes without ill effect.

Cistern, House A, rain water.—Color, faintly grayish; clearness, slightly hazy; sediment, see below; taste, flat; reaction, neutral; chlorine, none, with Ag NO_3; lime, none, with oxalate of ammonium; iron, none, with potash chromate; hardness, none, with Clark's soap test;

organic matter, decolorizes permanganate at once; sediment (microscope), almost none. Is not fit for drinking purposes; produces diarrhea.

Well, House B.—Color, faintly grayish; clearness, slightly hazy; taste, none, or flat; smell, none; reaction, neutral; chlorine, marked turbidity, with $AgNO_3$; lime, none; iron, none; hardness, none (Clark's soap test); organic matter, permanganate, none; sediment, reddish-brown vegetable matter. Is used daily for drinking purposes without ill effect

Cistern, House B, rain water.—Color, faintly grayish; clearness, faintly hazy; taste, slight, disagreeable; smell, none; reaction, neutral; chlorine, none; lime, none; iron, none; hardness, none (Clark's soap test); organic matter, none with permanganate; sediment, with microscope, reddish-brown vegetable matter. Not used for drinking purposes.

Well at pump station at eastern end of station, near storehouse.—Color, clear; taste, normal; smell, none; reaction, neutral; chlorine, none with $AgNO_3$; lime, none with ammonium oxalate; iron, none with yellow prussiate of potash and salicylic acid; hardness, none with Clark's soap solution; organic matter, with permanganate, none; sediment, almost none. An excellent drinking water; is used for that purpose by the commandant's family and others.

REPORT ON THE UNITED STATES NAVAL ACADEMY, ANNAPOLIS, MD.

By T. C. WALTON, *Medical Director, United States Navy.*

The good health of the station has been maintained throughout the year.

While the number of sick days in 1894 was 1,790, and in 1895, 2,055, there was a less number of admissions, the increase in sick days being due to 6 cases of exceptionally long duration that have recovered or are now convalescent. The deaths (2) were from chronic disease of the heart in elderly persons.

One case of febris enterica occurred in a cadet. As the first symptoms appeared within two weeks after entering the Academy, it is believed he contracted the disease previous to entering. Two cases of tuberculosis pneumonica occurred among the cadets. As soon as recognized they were granted sick leave; one has since resigned, the other continues on leave. Two cases of appendicitis also occurred among the cadets. One recovered without operation; in the other the offending appendix and an enterolith were removed, and he has now nearly recovered.

There were 19 admissions, involving sixty-one sick days, for injuries received at the game of football, and 90 excuses from drills from the same cause. These embrace 1 luxation and 2 fractures, 1 inguinal hernia, 2 cases of concussion of the brain, and a number of minor sprains and contusions.

The water supplied by the Annapolis Water Company has been more satisfactory in quantity and quality than in previous years. That furnished the cadets is passed through Pasteur filters and is made as potable as could be desired. A good system of filtration is necessary for the water in general use, as after freshets, owing to the limited capacity of the settling reservoirs of the company, the water furnished contains much earthy and vegetable matter.

The Welsbach light is being tried in some of the quarters. With light-colored shades to diminish the intense whiteness of the light, it would probably be an improvement on the argand burner now in use, as it furnishes a somewhat greater amount of light, is said to consume about one-third less gas, and evolves much less heat. It is not, however, as satisfactory in any respect as the incandescent electric light when furnished with proper shades.

The water-closets remain as last reported, but an appropriation has been granted for their improvement, so that in a short time those for cadets will have new and modern appliances and will probably be made satisfactory.

The sewerage system is about the same as when last reported. The sewer that opened near the marine barracks has been extended several feet outward into deep water, and the shoal pocket that allowed the accumulation of filth in the vicinity has been partly filled. As funds are available it will be completed, and probably that portion of the water front raised so as to prevent its overflow during easterly gales. Immediately adjoining that portion of the Academy grounds, and within a few feet of the barracks, a city street sewer opens and much of the filth of the neighborhood is deposited there. The following communication regarding this was made to the superintendent, under date of November 13, 1895:

> 1. I would respectfully call attention to the condition of Hanover street, Annapolis, in the vicinity of the marine barracks. It is made a repository for garbage, and the pocket formed by the filling in on each side of the street is the receptacle for the sewage of Hanover street from the sewer which opens there. In all conditions of tide the locality at the end of this street is unsanitary; at low tide it is offensive, filthy, and a menace to the health of the neighborhood.
>
> 2. The pocket referred to should be filled, the sewer extended sufficiently to insure its contents being carried into deep water, and the depositing of garbage in that locality prohibited.
>
> 3. If the city authorities can not be induced or compelled to put the place in good sanitary condition, I would respectfully recommend that the Academy authorities do so, in order to protect the health of the marines, who are constantly exposed to the bad influences referred to.

I learn the city authorities are about to take measures to have the cause of complaint removed.

The report of the last Board of Visitors calls attention to the unsuitable character of many of the Academy buildings and to the "grossly defective" condition of the sewerage system. Most of the sewers are short and lead, with considerable fall, in a direct line or with only one turn to the nearest water front. All of them empty at the sea wall except at the barracks, where both sewer and wall are being extended. They empty into various depths of water, from 3 feet upward. Before the extension of the sewer at the barracks the water was often so low at its mouth as to leave the sewage exposed and make it a decided menace to health. The sewers are readily flushed and during dry, warm seasons this is frequently done. At times defects occur from blocking or breakage, but these are remedied as soon as recognized. They are fairly well ventilated, though there is room for improvement by increasing the caliber and number of ventilators. Except among the marines I am not aware that any disease has resulted in the grounds from defective sewerage.

The cases of enteric fever that have occurred during the past twelve years have all been traceable to outside influences, and those that occurred among the marines were more than probably contracted in Annapolis, where contaminated well water was constantly used. Cases of severe remittent fever have occurred that were due to exposure to newly turned soil and climatic conditions, and outbreaks of diphtheria have occurred that I believed were traceable to the stable manure that was at the time abundantly spread over the grounds. When these influences have not prevailed, the sick reports, particularly those of the last three years, prove that the health of this community has been excellent, and that few places surpass this locality in healthfulness. I make this statement because quite recently I have been asked by parents and others interested in cadets if the place were not in an unhealthy condition, they having read in the newspapers that its buildings, etc., had been reported unsanitary, and in their minds unsanitary meant unhealthy.

To return to the sewerage, the opening of so many sewers along the sea wall is unsightly, and may at times endanger health. Means should be provided to conduct the sewage into deep water at some distance from the grounds. A trunk sewer, which has been proposed, would accomplish this if force were used for its frequent flushing. Owing to the lowness of the water front, sufficient fall can not be obtained for any sewer laid there to insure its being completely emptied, and unless this were accomplished the dangers from sewer-gas contamination, which are now at a minimum, would be increased manifoldly.

The unsuitableness of many of the Academy buildings is apparent to any observer. They are not well located, are unsatisfactorily lighted and heated, badly ventilated, and many of them hardly worth the repairs that are from time to time put on them to make them habitable. The main building is probably the worst adapted of any for its 180 occupants and the many purposes for which it is used. In previous reports I have called attention to its defects, which are now so numerous that it would seem worse than folly to perpetuate them by further repairs. It is hoped that Congress will grant the necessary power to carry out the recommendations of the board recently appointed to ascertain and set forth the needs of the Academy. If new buildings are to be erected, I would suggest that a medical officer of experience be consulted in the formation of the plans wherever the question of sanitation might be involved.

During the year new floors of maple have been laid in the old part of the sick quarters, and they are now in excellent order. Plans were submitted for an addition to the quarters, to be used as an operating room, bacteriological laboratory, and surgeon's office, at a cost of $2,500. The amount was not allowed. Such an addition, or one more elaborate, is necessary for the proper equipment of the sick quarters, and with it the quarters would answer for several years the purpose for which they are intended.

REPORT ON UNITED STATES NAVAL STATION, PORT ROYAL, S. C.

By T. N. BERRYHILL, *Passed Assistant Surgeon, United States Navy.*

I have to report that the health of the station during the last year has been good.

Malarial affections, which would, apparently, cause many sick days, have been few and mild, and each case of chills and fever admitted to the sick list has been contracted off the station.

Except in times of continued drought, rain water is used for drinking purposes.

The storage capacity for rain water has been increased by the building of a large brick cistern, holding 105,750 gallons, thus making the total capacity of the cisterns 165,750 gallons. This amount is still not sufficient for the uses of the station, and at times water has to be brought from Port Royal. The Port Royal water is obtained from an artesian well; its quality was pronounced good after an analysis at the United States Naval Museum of Hygiene. The water is brought from Port Royal in a lighter, thus offering innumerable chances for bacterial contamination. Either a condensing apparatus or an artesian well is needed to supply this station with a sufficient quantity of pure water.

A large area of the station, which is low and covered by high tides, has been filled in with earth obtained by dredging for the dry dock. Parts of the land have also been graded to bring it sufficiently high to prevent its being overflowed by extraordinary high tides.

The sewerage system is good and is flushed regularly by means of the water system used for fires.

The water for use of the quarters is pumped by hand from the cisterns to tanks in the attics of the houses.

The pipes for the fire system are distributed over the yard and the water forced through them by a powerful force pump in the boiler house. Either fresh water from the cisterns or salt water from the harbor may be used. There has been considerable grading and drainage done. A main road has been laid out and partly finished.

I desire, like my predecessor, to call your attention to the cramped quarters now used by the medical department at this station, which consist of one room about 12 feet square. It answers very well as a place for dispensing medicine, but is unsuited either for the examination of recruits or the treatment of patients. An emergency ward and consulting room are needed. I desire to call the attention of the Bureau to the advantages of this place for the location of a small hospital for the exclusive treatment of patients of the Navy suffering from tuberculosis of the lungs.

There can certainly be no question at the present day as to the infectious nature of tuberculosis, and as to the inadvisability of placing patients suffering from all kinds of affections in a hospital where they will be in close contact with consumptives, for frequently their condition renders them peculiarly susceptible to tuberculosis. The consumptives should be isolated in a place where the climate and other conditions are such that they may be treated with a reasonable prospect of being cured. That tuberculosis is curable, when taken early, is now recognized by nearly everyone. The fact that more than 60 per cent of autopsies performed on persons who have died from other causes show evidences of having had tuberculosis of the lungs at some time, would tend to make us believe that this disease is one of the most curable. At present, when every medical officer is able to determine the presence of the tubercle bacillus in the sputum, the cases should come under treatment very early after the contraction of the disease. Should patients at that stage of the disease be placed in a hospital especially designed for such cases, I see no reason why a majority of them should not be cured.

Were a careful and persistent examination made of the sputum of each case of cough, it is probable that all cases of tuberculosis of the lungs would be discovered in their early stages. If these cases could then be sent to some place having an equable climate, where they could spend almost all the time in the open air and receive good food, recreation, and judicious medication, I feel certain that almost all of them would be returned to duty well. This station would seem to me to answer the requirements.

The average temperature for the last six years was 66.7°. The average relative humidity for the last twenty years was 75. The mean number of days during which rain fell for the last nine years was 87.

Thus it may be seen that there is an average of nearly three hundred days in the year when no rain falls and during which patients could be in the open air. The humidity and temperature are rather high, but both are grateful to consumptives, and, in my opinion, have little to do with the progress of the disease. What is needed for the treatment of tuberculosis is the open air, and, in my opinion, all other things are secondary, and the place which allows the greatest number of days to be spent out of doors is the best for the treatment of this disease. A small amount of land should be connected with the hospital for the purpose of employing the patients in gardening, that they may have some object in being in the open air. The hospital should be inexpensive and so built that the wards would get the sun all day.

I respectfully submit the above to your consideration, hoping that it will meet with your approbation and that you may find it practicable to provide some place where this class of patients, who show about 10 per cent of the deaths and nearly 10 per cent of the invaliding, may be treated and isolated according to our present knowledge.

REPORTS ON CRUISING SHIPS.

REPORT ON THE U. S. FLAGSHIP PHILADELPHIA.

By George F. Winslow, *Medical Inspector, United States Navy.*

I have the honor to make the following report concerning the sanitary condition of this ship.

The general sanitary condition has been excellent. During the past year the health of the officers and crew has been particularly good. Few accidents have occurred and no diseases that can be directly traceable to defective hygienic conditions. The close of the year showed a very small sick list.

At different times during the year the gun divisions have been instructed in the use of tourniquets and the various means of controlling hemorrhage and handling the wounded.

During the year the *Philadelphia* has been anchored in the harbor of Honolulu for six months. The remaining portion of the time was spent at Mare Island Navy-Yard, the harbor of San Francisco, and in making passages to and from the Sandwich Islands.

At times merchant vessels have applied for medical and surgical assistance. This service has always been promptly and willingly rendered by the medical officers of this ship.

On April 13, 1895, P. A. Surg. Frederick A. Hesler reported as the relief of P. A. Surg. Rand P. Crandall, detached.

With high decks, the *Philadelphia* is in every way that which can be termed a dry ship and easily kept clean. The ship has been thoroughly inspected by me every Saturday. All holds, living spaces, and storerooms have been found sweet and clean. I have as yet found it unnecessary to call the attention of the commanding officer to any unsanitary condition.

The system of artificial ventilation seems to be perfect.

The absolute freedom from bad odors is remarkable. A rigid inspection of all fruit and vegetables from the shore has been maintained, and this no doubt has done much to lessen bowel complaints during the hot weather.

I am satisfied that the sanitary conditions of our new roomy ships of war have immense advantages over the wooden ships of the old Navy.

Number of days in port	336
Number of days at sea	29
Number of days in tropics and southern latitudes	181
Number of days in northern latitudes	184

The large number of American born young men in the crew of the *Philadelphia* is a great factor in the production and continuance of its sanitary condition. I have never been connected with a better crew, and their good behavior on shore has been constantly commented on. The small number of cases of alcoholism and the absence of long lists of punishments on board ship are remarkable.

The daily sick list has been composed almost entirely of slight ailments, which have only been treated for a few days.

REPORT ON THE U. S. FLAGSHIP SAN FRANCISCO.

By H. J. Babin, *Medical Inspector, United States Navy.*

In compliance with Article 682, United States Navy Regulations, I have the honor to submit the following sanitary report for 1895:

The sanitary condition of the ship and the general health of the ship's company have remained good during the year. One case of scarlet fever was treated on board and no contagion followed. The ship has been free from epidemic diseases. During the year the *San Francisco* has cruised over 21,000 miles, and visited the following ports, viz: Newport, Horta, Gibraltar (three times), Algiers (three times), Alexandria, Joppa, Phalerum Bay, Corfu, Palermo, Smyrna (twice), Alexandretta (three times), Mersyn (three times), Naples (twice), Malaga, Southampton (twice), Copenhagen, Kiel, Kronstadt, Stockholm, Christiania, Gravesend, Havre, Greenock, Lisbon, Marseilles, and Beirut. All the above ports were free from epidemic diseases at the time of our visit and gave clean bills of health. At Havre the water of the basins where the ship was lying was so filthy and polluted that on recommendation to the commanding officer none of it was used for washing decks or scrubbing paint work. Typhoid fever prevailed extensively at Havre and at Beirut, and was due to local causes.

REPORT ON THE U. S. FLAGSHIP OLYMPIA.

By Joseph G. Ayers, *Medical Inspector, United States Navy.*

The following is submitted as the sanitary report of this ship for the year 1895, embracing the period from February 5, when the ship was put into commission:

Summary of the cruise.—At Mare Island, Cal., from February 5 to April 2, and then sailed for San Diego, Cal., stopping at Sausalito, Santa Barbara, Prisoner's Harbor on the island of Santa Cruz, and returning to Mare Island May 1. Absent from Mare Island from June 11 to June 19, taking on board at San Francisco the naval militia of California for drill, and going to Santa Cruz. Left Mare Island June 27, carrying the board of inspection; at sea one day; at San Francisco from June 28 to July 19; at Mare Island from this date to August 14; at San Francisco from August 15 to August 25, and then sailed for Honolulu, Hawaiian Islands, arriving there September 2. Sailed for Lahaina, Maui, September 5, and there from September 6 to October 12. At Honolulu, from October 13 to October 23. From this date, at sea en route to the Asiatic Station, arriving at Yokohama November 9. At Yokosuka, Japan, for docking the ship, from December 18 to December 30, and at Yokohama at the close of the year.

Further than two deaths, one from pneumonia and one from fracture of the skull by recoil of a gun, and a case of amputation at the knee joint following an accident, which have been already mentioned in the statistical reports, there have been no cases of sickness of such unusual interest as to merit special mention.

Air space of quarters.

Quarters.		Number of occupants.	Total air space.	Air space per occupant.
			Cu. feet.	*Cu. feet.*
Cabins, 2 on main deck		2	8, 736	436. 8
Wardroom	16 staterooms	16	6, 414. 4	400. 9
	country	....	7, 046	....
Steerage	5 staterooms	10	2, 555. 5	255. 5
	country	(*a*)	1, 932	386
Warrant officers' rooms		3	1, 239	413
Berth deck		222	36, 511	164. 5
Gun deck		156	21, 622	138. 5
Sick bay		....	1, 631	....
Two cells in bow		....	253	....

a Five at night.

A considerable number of the crew also sleep in the four torpedo rooms and fore and aft passageways, with more air space per man than found on the gun and berth decks.

The sick bay, about 24 feet long, 11 feet wide aft, 7 feet wide forward, and 7 feet 3 inches between decks, is situated on the starboard side of the berth-deck well forward.

It is comfortable, well lighted, and adequately ventilated in good weather at sea and in port, but with a heavy sea, when all hatches and ventilators on the forecastle are closed, it is not a fit place for the care of the sick, and at such times, as happened during the recent voyage from Honolulu, the sick would have to be quartered in the superstructure.

It is provided with a bath tub with hot and cold water, both salt and fresh, a washstand with running water, water-closet with one seat, desk and lockers in ash, and presents a handsome appearance. The dispensary—opposite, on the port side—has running water, and counter, with drawers, and lockers also handsomely finished in ash.

The medical storeroom is well situated in the lower after passageway.

The water-closet for the enlisted men consisted, when the ship went into commission, of 2 iron troughs, continously flushed, set almost in contact with the deck and supporting 8 seats, and of 2 small earthen urinals. It was so hard to keep clean and the urinals were so inadequate for so large a crew that the troughs were raised some inches from the deck, the urinals taken out, and new urinals constructed forward of it, one on each side of the deck, consisting of iron troughs continuously flushed with jets from a horizontal pipe. The deck beneath urinals was covered with heavy sheets of lead with scupper holes leading to the common discharge pipe. The improvement has entirely changed the sanitary features of the place, before highly offensive with strong odors. All other water-closets throughout the ship are very well constructed, conveniently located, and flushed by a constant flow of water at all times.

The ship below the main or gun deck is ventilated by two Sturtevant blowers placed on the berth deck, acting through galvanized-iron conduits, with louvers in storerooms, passageways, and living spaces. In so extensive a system, even with the maximum speed of about 400 revolutions, some distant parts are poorly ventilated, particularly the forward part of the berth deck in the neighborhood of the water-closets for the enlisted men. It would be better if a separate blower were used for this part of the ship, which is closed up entirely in rough weather at sea, there being absolutely no means of introducing fresh air about the closets unless by reversing the blowers, when but a feeble current could be introduced, and by the two doors in the water-tight bulkhead separating this compartment from the rest of the berth deck.

In port, and at sea in good weather, this part of the ship is fairly well ventilated.

The dynamo room, situated below the protective deck near the bow, has two electric blowers which give sufficient ventilation except at sea under the conditions above mentioned, when the Sturtevant blowers on the berth deck, which act feebly in this distant part, and the door opening into the forward passageway furnish the only means of ventilation. At such times the temperature is very high and the air almost stifling. Changes are necessary which will extend the ventilators now opening on the forecastle to the superstructure, for the reason that the ventilators on the forecastle have to be closed to keep out water from spray or seas breaking over the bow.

A temperature of about 180° F. or more has been experienced in two of the fire rooms which had no blowers. Since, air conduits have been introduced from blowers of adjacent fire rooms.

It is hoped that this alteration will be effective to the desired degree.

An epidemic of Asiatic cholera was prevailing at Honolulu when this ship arrived there September 2. For this reason an anchorage was made in the outer harbor and the ship went to Lahaina, Maui, September 5, without having had communication with the shore.

Cholera made its appearance in Honolulu about the middle of August, brought probably by the steamer *Belgic*, which arrived there from China and Japan some days previously. No case occurring after October 2 (there having been 88 cases and 63 deaths to that date), the ship returned to coal in the outer harbor October 13, and October 23 sailed for Japan. It appears that the recent epidemic of Asiatic cholera in Japan was most active in August, and had entirely disappeared about December 22, at which time there had been 56,582 cases and 39,975 deaths.

The sanitary reports made by the United States consul-general at Kanagawa show the following number of cases at the dates mentioned from the beginning of the outbreak:

	Cases.	Deaths.		Cases.	Deaths.
June 28	2,847	867	September 12	42,706	28,513
July 5	4,337	2,473	September 26	48,421	33,189
July 18	7,591	4,590	October 10	52,218	36,075
August 1	12,331	7,629	October 31	55,611	38,829
August 15	21,416	13,813	November 14	56,367	39,721
August 29	32,997	21,835			

In Kanagawa Ken it commenced in June and had disappeared by November 15. The Hongkong Government Gazette of November 30, 1895, reports 26 cases of bubonic plague as having occurred in the colony between April 1 and September 16, 1895, and that it was thought that the last of the disease had been seen. All the cases died, and the disease showed no signs of abatement in point of virulence. The experience of this season seemed to show that the epidemic was nipped in the bud by the prompt removal and segregation of the inmates and disinfection and cleansing of the infected premises.

REPORT ON THE U. S. FLAGSHIP NEW YORK.

By MICHAEL C. DRENNAN, *Medical Inspector, United States Navy.*

At the beginning of 1895 the ship was at the navy-yard, New York, being prepared for a cruise among the islands of the West Indies. It left there in the early part of January and went to Hampton Roads, Virginia. While at the latter place an outbreak of measles occurred among the crew. Of those attacked (8 in number) 7 were transferred to the Naval Hospital at Norfolk and 1, an officer, was isolated on board ship, and ultimately discharged to duty. No other cases of the disease appeared later.

There were 2 cases of grippe, 18 of tonsillitis, and 19 of acute rhinitis admitted to the sick list during the first quarter. At the close of January the ship sailed from Hampton Roads, and six days later arrived at St. Thomas. After the first few days out the weather grew warm and pleasant and the admissions to the sick-list decreased. Four days were spent in St. Thomas, and then Santa Cruz was visited. After two days in the latter port the ship proceeded on her cruise, touching at the following places: Martinique, St. Lucia, Barbados, Port au Spain, La Guayra, Port au Prince, Santo Domingo, Kingston, and Colon.

There was reason to believe there were cases of yellow fever at St. Lucia while the ship was in the harbor, though its existence was officially denied. While making the trip from La Guayra to Santo Domingo a sergeant of marines attached to the ship, suffering from melancholia, swallowed a large amount of battery fluid, which he obtained during a momentary absence of the apothecary from the dispensary. He died several hours later and was buried at sea.

The hospital accommodations and sanitary arrangements at the ports mentioned above have been so fully described in other reports that a further mention of them in this is needless.

At Colon orders were received to send the ship to New York, which was reached April 28. After making some necessary repairs at the navy-yard, we sailed, on May 18, for Southampton, England, arriving there ten days later. From there a trip was made to Copenhagen, then to Kiel, Germany, where we took part in the ceremonies attendant upon the opening of the Kiel Canal. Several weeks were spent at the last port, and the ship returned by way of Gravesend, England, to New York Navy-Yard.

I reported for duty on board on August 5. A few days later the ship, in company with the ships of the squadron, began a cruise along the coast of New England. The ports visited were Newport, Bar Harbor, Portland, Boston, and Fishers Island. At each place there were drills almost daily. Between Newport and Bar Harbor target practice with great guns was held. At Fishers Island boat drills and landing parties were of daily occurrence. Returning to Tompkinsville, the ships were coaled, and then a cruise south as far as the capes of Virginia was made, during which there were squadron evolutions. Bad weather rendered it advisable to seek shelter in Lynn Haven Bay. Later the squadron went out for target practice with great guns. Upon the completion of that important duty the ships went to Hampton Roads.

Early in November the *New York* was ordered to the Brooklyn Navy-Yard. While there it was placed in the dry dock. At that time a cold wave set in and caused much discomfort to those on board. The ship is heated by steam. On occasions there is not enough heat; on others the temperature of the berth deck is too high. This last condition often obtains in the wardroom; then the skylights are raised, and colds frequently result. The question of heating and ventilating a ship in cold weather is a difficult one; it is even more so in spring and autumn. There are those whose age, duties, and habits are such thatto them artificial heat means discomfort, except in extremely cold weather; others, whose duties are of a sedentary character, find a low atmospheric temperature is not only a discomfort, but a danger to them. The introduction of electric lighting and the use of electricity as a means of hoisting weights and working steering arrangements has, to my mind, furnished a remedy for the vexed question of heat for those who really need it. A small electric heater supplied to those whose duties require them to spend much time below deck would add to their personal comfort without causing discomfort to others.

The general ventilation of the ship is good. In warm weather, when the air ports are open and there is no necessity for closing the hatches on the upper deck, the absence of disagreeable odors in the ship is very marked. In cold weather, with ports and hatches closed, ventilation is naturally lessened. On such occasions the gun deck is not so well ventilated as the berth deck. The proper method of supplying fresh air to the former is one that should receive attention from experts. Compartment No. 148, in which the warrant officers' quarters are situated, and No. 149, occupied by a part of the marine guard, and the paymaster's office, should have a double ventilating apparatus for exhaust and supply. The steam steering room, which was one of the very hot places of the ship, has been improved by connecting it with the upper deck by means of a large tube and the addition of an electric blower and fan. When the ship is under steam in hot weather the berth deck, junior officers' quarters, and the forward wardroom are uncomfortably warm. A number of officers have found it necessary to supply themselves with electric fans, which have some effect in reducing the temperature of their staterooms.

The location, arrangement, and capacity of the sick quarters of the ship have been so thoroughly discussed that any remarks on the subject by me are unnecessary. During the recent cold weather the temperature of the additional sick quarters on the gun deck was too low for health or comfort. I recommend that they be connected with the steam-heating plant of the ship.

Six cases of hernia occurred among the crew. One of them was a bayman, and in his case the disability was caused by lifting the hatch cover of the medical storeroom. This cover has since been fitted with hinges. It can now be raised by means of a pulley.

Some changes have been made in the evaporators. So far as I can learn, they furnish an abundant supply of good water.

On December 16 the ship left New York, and the next day anchored in Hampton Roads. The other ships of the squadron joined us there, and preparations were made for the departure of the squadron on December 21 for a cruise in the Caribbean Sea. Before that date orders were received delaying the departure of the squadron, At the close of the year we were at anchor in Hampton Roads.

REPORT ON THE U. S. FLAGSHIP BALTIMORE.

By JAMES A. HAWKE, *Medical Inspector, United States Navy.*

The following yearly report of the medical department of the U. S. S. *Baltimore* is herewith submitted:

As both the climatic conditions and the hospital facilities of all the ports visited by the *Baltimore* during the past year have been fully reported upon, I shall not give a detailed account of them.

January 1, 1895, found the ship at Chefoo, China. With the exception of a few sporadic cases of variola ashore the health of the port was good. The general hospital there has accommodations for 100 patients and is conducted by skilled European physicians; the Sisters are in attendance. Several foreign men-of-war in the harbor sent their men there, and their medical officers were well pleased at the treatment they received. The health on board was excellent.

On January 7 we arrived at Chemulpo, Korea. Sickness here, among the natives, was confined to a few cases of variola. There is a Japanese military hospital here, lately erected, situated on an eminence behind the Korean town. It is under the charge of an experienced and courteous Japanese surgeon, Dr. Oki. There are accommodations for 40 patients. The surgical cases were wounded in the fighting in this vicinity, especially at the battle of Asan. There were but few patients in the hospital, the convalescents having been transported to Japan. The prevailing diseases were Korean fever (malarial), diarrhea, dysentery, and beri-beri. The patients occupied spaces on the floor matting, instead of beds, as is the Japanese custom. A commodious, well-lighted, and exceedingly clean operating room is at hand, well stocked with all necessary instruments and appliances. The results of operations and of treatment at this hospital were very satisfactory.

Dr. Landis, of the English mission, can care for 12 patients in a small but well conducted missionary hospital.

From January 23 to February 27 the *Baltimore* lay in the harbor of Chefoo, China. The weather was very severe and trying upon officers and men, but caused no change in the usual good health of the vessel. Our next port was Nagasaki, Japan, where we remained fifty-five days, during which time nothing of medical interest occurred on board. The health of the city was exceptionally good.

The general hospital, near the English hatoba, is in excellent condition, and well calculated to find favor in the eyes of foreign physicians. One case of lymphadenitis, which we transferred there, was skillfully and thoroughly treated. One of the largest medical schools of Japan is situated just outside of the city. The school is conducted on a military basis, and military instruction is compulsory. The Western system of medicine is taught, and in their hospital difficult surgical cases are operated upon with success.

The quarantine station, 2 miles below the city, and on the eastern bank of the entrance to the harbor, has been in operation for five years. The measures adopted are those recognized by the highest sanitary authorities, and are exceedingly thorough. Fruits of this are seen in the diminution in the number and virulence of cases of cholera, which formerly created such sad havoc in this same harbor. On April 27 the ship left for the Imperial Japanese dockyard at Yokosuka, and was docked, and after a short visit to Yokohama, 14 miles distant, returned to Nagasaki, arriving there May 10.

A trip to Kobe and Yokohama, June 7 to July 31, was devoid of medical interest, and August 5 found us again in Nagasaki. Cholera had obtained a foothold, and our stay was short. The local authorities were working with great diligence and system, and to their efforts, combined with the excellence of the water supply and the vigilance at the quarantine station, the disease was kept fairly within bounds. No liberty was allowed the men. On August 14 we came to anchor in Chefoo.

While here the weather was pleasant and invigorating. The cholera which was present on shore deprived the men of liberty and necessitated the return of the officers to the ship at sundown. Restrictions were placed upon the food supplies obtained from the shore, both from the prevalence of cholera and the presence of an epidemic of anthrax among the cattle. One of the French men-of-war had 40 cases of cholera on board, and the several small foreign men-of-war in the harbor from 1 or 2 to 5 cases. With the exception of 1 severe case of diarrhea, we had no cases of gastrointestinal disturbance on board. During the last week of September the health of the city was such that sundown liberty was granted the men.

While at Chefoo the fleet battalion, consisting of companies from the *Baltimore*, *Concord*, *Yorktown*, and *Petrel*, landed three times for drill on an island in the harbor. The vessels also participated in a three days' drill in squadron evolutions off Chefoo. On October 3 we arrived again in Nagasaki and remained there sixteen days. The city was free from any epidemic influence at that time. On October 2 we arrived at Woosung, China, a small Chinese town 10 miles below Shanghai, our draft not allowing us to go up to the city. There was no epidemic and the men enjoyed forty-eight hours' liberty, from which no ill effects were perceived.

The Shanghai general hospital has been described in previous reports. It is an excellent institution. The German and English physicians who are at its head are graduates of the best European universities, and are untiring in their efforts to promote the interests of the hospital. I regard it as the most competently managed and the finest equipped hospital I have seen in the East. During the epidemic of cholera in Shanghai last summer a large number of patients were treated with great success by the intravenous injection of a normal saline solution.

On November 15 the vessel arrived at Yokohama, where we found the U. S. S. *Olympia*, our relief. The health of the ship and port was all that could be desired. After preparing for the long transpacific voyage, we left for Honolulu, Hawaiian Islands, December 3. The passage to the Hawaiian Islands was an exceedingly stormy one. When three days out from Yokohama, we encountered a typhoon which caused us to lie hove to for five days. The sea ran very high, but the ship rode lightly, and no serious damage was done to her structure. Carpenter Cooper was thrown violently to the deck by a sea, causing concussion of the brain. The captain of the forecastle, A. Jessen, was washed overboard while securing gear on the forecastle, and lost. Many contusions, bruises, and small fractures resulted from the excessive motion of the ship and from the force of the sea which boarded us. Another gale of less severity was encountered on December 15, and we arrived at Honolulu December 23, twenty-one days out.

Carpenter Cooper was immediately transferred to the Queen's Hospital, where he died at 2 a. m. the following day. This hospital has been fully described in a report by Dr. Winslow for 1894. It is an excellent and decidedly modern institution in all respects, where one may be sure of the latest and most approved treatment. The Kalihi Hospital, or receiving station, and house of detention for lepers, is situated about 3 miles from the city. Here are brought and examined all the suspects, and in another part of the institution are quartered the children born in the leper settlement of Molokai. They are taken care of and watched for evidence of the disease until they reach the age of 14, thus combining the offices of an orphan asylum and hospital of observation. Fifty little ones have been brought here, and only one (who lived for some time in Honolulu, and has a history of contact with lepers) has developed the disease.

In an examination of 20 suspects, only a few days ago, all showed unmistakable evidences of leprosy, about 30 per cent being of the anæsthetic variety, which appears to be about the usual percentage in these islands. The leper settlement of Molokai has now 1,100 patients, and the native population of the islands is about 35,000. An epidemic of cholera was present here in Honolulu last summer, but was well handled and soon stamped out. The health of both ship and port is good. The year ended while we were lying in Honolulu.

A number of recruits were examined on the station. The material was very poor, being chiefly refuse from merchant vessels. Distilled water has been used throughout the year, without an exception, to which undoubtedly our freedom from gastrointestinal disturbances has been due. The ventilation, lighting, and structural condition of the ship has not been altered since the last report was submitted. The compartment used as a sick bay is the after torpedo room, on the orlop deck. It is satisfactory in part only. While at sea the ventilation is not good and the motion excessive. The transportation of the sick or wounded to the bay is difficult, and those able to walk must pass through a bunker, an engine room, workshop, and a passageway.

The average daily sick during last quarter was 8.8. This is above our ordinary average. Eight surveyed patients, whom we are taking home from other vessels, and a large sick list, owing to injuries received during the typhoon, caused the percentage to be abnormally high. The two junior medical officers of the ship have been frequently detached and ordered to other duty. One was absent for several months accompanying the marine guard to Tien-Tsin, China, and the other with the guard in Seoul, Korea.

The epidemic of cholera which visited Japan last summer was the most extensive experienced in many years. Cases were first heard of at Port Arthur, China, and in the Pescadore Islands, where the Japanese forces had been stationed awaiting reinforcements, and where there were reported more than 800 deaths up to the middle of April. In the naval station of Moji there were a number of cases during the early part of March, and in May the disease appeared at Hiroshima, from whence it spread to every province of the Empire. An infected soldier transported from Port Arthur is said to have been the first case. The total number of cases in the Empire was 56,367, and of deaths 39,721; percentage of deaths, 70.45. Hiroshima suffered more than any other ken, losing 3,049 out of 4,043 cases; next came Hiogo, with 3,759 cases and 2,855 deaths. Yokohama lost 587, Tokyo, 2,487, and Nagasaki, 1,204.

REPORT ON THE U. S. FLAGSHIP NEWARK.

By R. A. MARMION, *Medical Inspector, United States Navy.*

The first six and a half months of the year were spent in the Rio de la Plata, and were only interrupted by the necessity for going elsewhere to give the ship the usual docking and painting prescribed by Navy regulations.

For this purpose we left Montevideo on July 14 for Cape Town via Rio de Janeiro, spending about a week in the latter place. In spite of the fact that smallpox was prevailing to a considerable extent and a few deaths were occurring from yellow fever each day, the strict sanitary regulations of the squadron protected us completely from all of the local diseases.

During our stay of seventy days at Cape Town epidemic catarrh made its appearance on board and lingered for several weeks, attacking 92 persons. As a rule the disease was of a very mild type. No deaths occurred from it.

From Cape Town we returned, reaching Rio de Janeiro November 5 and remaining there until November 16, when we sailed for Montevideo.

With the exception of the epidemic just referred to, the health of the ship's company has been good.

Fortunately, the sanitary condition of Montevideo continues excellent, and there is no danger of epidemic disease originating here or spreading to any great extent when imported.

During the early part of 1895 cholera reached this city from Argentina, and though it never prevailed to a very alarming extent cases were constantly appearing in various parts of the city comparatively remote from each other, so that it was deemed necessary to adopt special measures to prevent its appearing on board our ships.

The measures which I suggested to the commander-in-chief consisted, first of all, in stopping the liberty of the enlisted personnel, and, secondly, in a rigid exclusion of all articles of food likely to be a vehicle of the disease. These measures were enforced until a period of two weeks elapsed after the appearance of a "new case."

While, however, Montevideo enjoys comparative immunity from scourges of epidemic diseases, the climate is so variable and changes of temperature are so sudden that it seems especially productive of neuralgic and rheumatic affections of a subacute character among those living here on shipboard for a long time as is the case with our crews. I have observed this in many instances even where the persons affected have never previously had such troubles.

Since the draft of this ship practically condemns her to anchorage off Montevideo; since she can not through fear of yellow fever lie in Rio, and there is no other port on this coast that is in every way suited to our requirements, there seems no escape from these climatic conditions so long as she is attached to this station.

Regarding the climatology and health of Rio de Janeiro I can say nothing that is either commendatory or encouraging. While large sums of money are being expended in beautifying the city, even to the extent of erecting costly monuments, there is no evidence that anything is doing or even contemplated with a view to improving the sanitary condition.

Even the presence of smallpox in an epidemic form did not give rise to any attempt to cleanse the streets in the locality which was mainly infected.

I am satisfied that it is possible to virtually stamp out yellow fever in that vicinity by properly constructed sewers and measures for thoroughly flushing the bay, which would be comparatively simple engineering problems; but the question is receiving no attention whatever. In the meantime yellow fever in epidemic form has become an annual visitor, and from the reports now reaching us from there it would seem that this year's visitation will be worse than the average.

An official report shows that during the period beginning with December 6, 1893, and ending with April 30, 1894, there were 4,336 deaths from yellow fever and 1,343 from malaria.

Foreign physicians claim that very many cases recorded under the head of malaria could be added to the yellow fever sum.

The epidemic of 1893–94 was exceptionally severe, but under similar thermic conditions may be equaled during any season. There is probably not a month in which yellow fever does not cause deaths in Rio, although the identity of the disease is masked under the name of "malaria" or "acceso pernicioso."

With the exception of "epidemic catarrh," Cape Town has for several years been free from an extensive epidemic. The work of constructing a complete system of sewerage is progressing systematically, and when completed nearly all of the sewage will be delivered outside of the breakwater in Table Bay.

DIET, ETC.

I have no suggestions to make with regard to the food supply, since the nature of our cruising and the existing regulations permit of sufficient latitude for all of our purposes.

Our recent cruise to Cape Town and back emphasized the importance of greater facilities for making and baking fresh bread than are at present within our reach. When one compares the attention which the French navy pays to this matter, our neglect of it seems inexplicable. We have fairly good ovens in our galleys, but it is an accident if an experienced and competent baker is found among the so-called cooks; cooks are not necessarily bakers, and vice versa.

Distilled water alone has been used for drinking purposes. During a few days while at Cape Town water from ashore was used for cooking in an emergency, but with that exception distilled water alone has been used for cooking purposes.

INSTITUTIONS INSPECTED.

I made a thorough examination of the Misericordia Hospital at Rio, but as it has been so much reported on I deem it unnecessary to enter into details regarding it, further than to say that no contagious or infectious diseases are now received there for treatment if the cases are known to belong to those classes. When such proves to be the case after admission they are, if practicable, transferred to special hospitals devoted to such diseases.

VACCINE FARM.

About a year ago the Government established a vaccine farm in order to be independent of foreign sources of supply. An establishment for the collection and distribution of lymph and for gratuitous vaccination is now in complete working order in Rio proper.

There is no law enforcing vaccination in Brazil, but placards warn the people that they are liable to fine unless they present themselves for vaccination, and the result is many go to the Government establishment for the purpose.

Virus is given gratuitously to physicians for use in their practice, in tubes of various sizes, no other method of collecting and preserving it being used.

Those who come to the office are vaccinated directly from the calf. The calves are selected in the State of Minas, males of any color being preferred. Where heifers are used only white ones are selected. Why this discrimination was made against spotted or colored heifers was not made clear to me. They are kept under observation for thirty days before inoculation, sickly or otherwise undesirable ones being weeded out.

During their term of probation they are kept in scrupulously neat stables and well cared for. Lymph which has been collected in tubes is retained until a thorough microscopic examination of the tissues of the calf from which it has been taken shows that the animal was free from disease. Extra care, I was told, was observed in selecting calves for direct vaccination.

They were on the eve of inaugurating a system of injections of "tuberculin" in every calf before inoculation.

While at Cape Town I visited the Government leper colony, which is established on Robben Island (Table Bay), about 7 miles from the port. There are nearly 600 patients in the various hospitals, a few being from the Orange Free State through arrangements with the Cape authorities; the remainder belong to Cape Colony. No attempt at specific treatment is made, there being no laboratory connected with the establishment, although steps to create one were under consideration.

On the same island there is an insane asylum where about 300, mainly incurables, are under treatment. A hospital for the more acute cases is situated on the mainland beyond Cape Town.

GENERAL OBSERVATIONS.

On the occasion of the revision of the squadron routine I suggested to the commander in chief a scheme for the instruction of the ship's company in "first aids to the injured," and it has accordingly been inaugurated throughout the squadron, instruction being given each Monday afternoon to one division at a time. I am greatly encouraged by the interest which the instruction arouses, and I have no doubt that much of it will be assimilated.

Emergency medicine boxes have been ordered for all boats other than the hospital boat, and the crews will be instructed in the use of their contents.

The "stretcher bar" called for by General Order, No. 452, has not yet been received, and I am, therefore, unable to report upon it.

Inspections of the *Castine* and *Yantic* have been made during the year, and your attention is respectfully called to the reports thereof, which were submitted at the time to the commander in chief.

REPORT ON THE U. S. S. COLUMBIA.

By W. G. FARWELL, *Surgeon, United States Navy.*

I have to report that since the last sanitary report of this ship the general health of the crew has been good.

With the exception of a short visit to the West Indies in the latter part of March and April, the ship has been in high latitudes, where the humidity of the atmosphere has been relatively low, a condition favorable to health on ships with as many decks as the *Columbia*.

The *Columbia* arrived on April 28 at New York from the second trip to the West Indies.

On May 20 sailed from New York to participate in the functions of the official opening of the Kiel Canal, at Kiel, Germany, calling en route at Southampton, England, and Copenhagen, Denmark.

Arrived at Kiel June 15, and remained fifteen days, leaving June 30 en route to the United States, calling at Southampton, England, for coal and to dock the ship.

Left Southampton July 26 and arrived at New York August 2, having made the trip in the remarkable time of six days twenty-three hours and forty-nine minutes.

The men were comfortable; the engineers' force not too hard worked, the regular force being increased by a certain number of men from deck, as many as could work conveniently; the fire rooms comparatively cool; the ship under natural draft.

We have spent the remainder of the year in the harbors of New York, Hampton Roads, and adjacent waters.

I would respectfully repeat the recommendations, not already carried out, contained in my last year's report, viz:

(*a*) Ventilation of superstructure.

(*b*) The iron bulkheads of engine hatchways to be covered by a nonconductor.

(*c*) Alterations in officers' rooms, protecting the bunk from cold by filling the space behind them with felt or magnesia; also to put a glass window before the square iron port now wholly unprotected (24 by 24 inches).

(*d*) While the ship was at the navy-yard, New York, a board recommended that the officers' bunks be so protected.

(*e*) One room has been altered by putting the bunk athwart ship.

(*f*) This has made its occupation more comfortable by removing the occupant from the drafts at the side of the ship, but as the side of the ship and large square port are still unprotected the general temperature of the room has not been improved, but rather lowered.

If it is impossible, as seems probable, to remove wooden bulkheads altogether, I would suggest covering them with felt, to prevent the flying of splinters in action. This would reduce that danger considerably.

Some of the storerooms having steam pipes passing through them are too highly heated.

Some time since, while inspecting the ship, I found the temperature of the wardroom storeroom 95° F.—a temperature destructive to the preservation of canned goods and wines.

The peculiar construction of the ship—great length and intricate passages—necessitates the establishing of two stations for the wounded, one in sick bay forward and the other in wardroom aft, and in battle there would probably be another in the superstructure.

I would recommend that an additional medical officer be detailed, and that one bayman be added to the complement.

All decks under cover have been kept shellacked and great comfort thereby secured.

While the ship was at Southampton, England, I availed myself of the opportunity to visit Netley Hospital. I made the acquaintance of Professor Wright, the well-known English authority on bacteriology, and his talented assistant, Major Semple, R. A. I was much interested in their germ cultures and antitoxin preparations. They prepare the antitoxin for diphtheria in large quantities. They assert that weight of evidence is in its favor and that it is being used extensively with the best results.

REPORT ON THE U. S. S. MAINE.

By JOHN L. NEILSON, *Surgeon, United States Navy.*

The *Maine* was completed and placed in commission at the navy-yard, New York, September 17, 1895. The report embraces a period of a little more than three months, and therefore is subject to the criticism of limited time of observation and of the presence of the ship in the most favorable conditions of region and temperature, namely, on the Atlantic coast between Portland and Hampton Roads and in temperatures usually moderate, the extremes noted being 80° and 14°. Doubtless the cruise now contemplated to the West Indies will modify some of the views herein expressed; however, it is believed that the facilities for ventilation, both natural and artificial, and the comparatively ample air space in living quarters provide factors of safety sufficiently elastic to meet the strain of higher temperatures in the Tropics.

The ship, with dimensions of 324 feet length, 57 feet beam, draft of 21 feet, and freeboard of 11 feet, may be described as an enormous floating gun platform, in which everything is subsidiary to the real fighting portions, namely, two revolving turrets, each containing two 10-inch guns, and placed, one on the starboard side forward, and the other on the port side aft. Between these turrets, on the main deck, is a long steel house, called the middle superstructure; forward of starboard turret is another steel house, called the forward superstructure, and at the stern of the ship is still another, called the after superstructure. These superstructures are so distributed as to leave ample spaces of deck for the sweep of the turret guns in action, and for broad gangways around and between the turrets and superstructures.

Viewed from a sanitary point, these open spaces are of great utility, affording necessary open air places for exercise and drill, allowing access of sun and air on all sides of the structures, and making it possible to have several large hatches opening directly from the main deck to the berth deck.

The after superstructure is divided by a longitudinal bulkhead into two sets of quarters, the starboard set for the commanding officer of the ship and the port for the commanding officer of the fleet.

There can be no question as to their good sanitary condition. Each set of quarters has an initial air space of 3,000 cubic feet, and renewal by hatches and air ports is unlimited. The lavatories are modern and in perfect condition.

The main superstructure accommodates as night quarters 65 men, and affords them an initial air space of 153 cubic feet per occupant. This is not large, but the facilities for natural ventilation are so good as to obviate any shortcomings in this direction by means of numerous hatches, doorways, air ports, and the exposure of the sides of the structure to the direct rays of the sun.

The forward superstructure accommodates as night quarters 50 men, and has an initial air space of 118 cubic feet per occupant. This small air space is vitiated by the exhalations from two trough water-closets, one starboard and one port, which furnish accommodations for the whole crew, excepting the chief petty officers. It is almost impossible to prevent, even with the greatest of care, the constant presence of ammoniacal and fecal odors, especially when closed at night.

There are no means of artificial ventilation in any of the superstructures. They are heated by radiators, and are unshellacked.

BERTH DECK.

WARDROOM.

This is an apartment unexceptionable in size, ventilation, and appointments. It is situated in the extreme afterpart of the berth deck, and is 70 feet in length, 8 feet 9 inches between decks, and the entire width of the ship. There are 18 cabins, large, airy, and each lighted by a 12-inch port. These cabins are built against the side of the ship, leaving a large country, in the forward part of which is a hatch 4 feet 6 inches by 7 feet 10 inches, extending through the after superstructure to the poop, and in the afterpart another hatch 4 feet by 6 feet 6 inches. The initial air space gives to each occupant 735 cubic feet, calculating the air space of country and cabins together, since they are so intimately connected, by the nonextension of the longitudinal bulkheads to the deck above, and by two venetian blinds and a sliding door in each cabin. Each cabin has a duct from the blower. No messing is done nor smoking allowed in this apartment. Through it pass two large ventilating pipes, the after one extending from the poop deck to the tiller room below the wardroom, and furnished with a large grated opening in its course through the wardroom. The forward pipe is a hollow military mast, and is made an educt from the tiller room by means of an electric blower, but has no connection with the wardroom.

WARDROOM MESS ROOM.

Forward of the limiting bulkhead of the wardroom, on the starboard side, is the wardroom mess room, a large, commodious apartment, well ventilated by four ducts of the blower, three 12-inch ports, and a hatch in the open deck. This apartment, however, promises to be warm, as it is over the engine cylinders and abreast of the engine-room hatch.

JUNIOR OFFICERS' QUARTERS.

These are situated just forward of the wardroom mess room and have five staterooms, two bunks in each, and a country. At present there are eight occupants, giving an initial air space of 412 cubic feet. Each stateroom has a 12-inch port and a duct from the blower, and there are three ducts of the blower in the country. The natural means of renewal are rather limited, as the doors open on a narrow passage, the opposite side being occupied by pantries and mess rooms.

WARRANT OFFICERS' QUARTERS.

The three staterooms assigned to these officers are disposed about the base of the after turret, opening into the irregular open spaces bounded by the engine room and base of turret and port side of ship. They are large, airy, and from their position are afforded an unlimited air supply. The initial amount is 433 cubic feet per occupant.

BERTH-DECK QUARTERS FOR CREW.

This space, extending to the bows of the ship from the limiting bulkhead of the steerage quarters, is divided into five compartments, and affords 199 cubic feet initial air space to each of its 216 occupants. The renewal of air is secured by numerous hatches, 12-inch ports, and ducts from the blowers. The entire berth deck is shellacked and heated by radiators.

ACCOMMODATIONS FOR THE SICK.

The sick bay is located on the port side of the berth deck in compartment A 103, and has a capacity of 2,800 cubic feet. It is ventilated by two ducts from the port Sturtevant blower, by two 12-inch outboard ports, and by three 12-inch ports and three screen windows opening on berth deck. One door opens on berth deck and another into the dispensary. It contains a bath which is, however, supplied only with cold water, a water closet, and a permanent washstand. The position of the large trunk of the Sturtevant blower, which passes through the whole length of the bay, and the necessary screening off of closet and bath tub, interfere to such a degree that but four cots can be swung. The midship location of the bay secures the sick from the usual noises of the forecastle, but as it is placed over the dynamo room, the hatch of which opens a few feet from it, the location may be overwarm in hot weather, while the incessant noise of the dynamo below and of the Sturtevant blower just abaft is annoying, and renders accurate physical examination of lungs and heart almost impossible. Being situated so near the blower, the artificial ventilation is adequate. The artificial lighting of the sick bay should be doubled.

The dispensary is located forward of the sick bay, communicating with it by a door, and is practically a part of it. It is ventilated by a duct from the blower, by two doors, and two 12-inch ports—one inboard, the other outboard. It is eminently satisfactory in its size, arrangements, and appointments. It is to be specially noted that neat ash strips and brackets have replaced the metal bottle clasps. Both sick bay and dispensary are heated by steam radiators.

The medical storeroom is located on starboard side of passage leading forward from steam steering engine room. It is large, cool, dry, well ventilated and arranged.

The questions of station at general quarters and of the transportation of the wounded in time of battle have occupied the attention of the commanding and medical officers of this ship, but they are still, in a great degree, sub judice. Were this vessel of the usual cruiser type and nearly all accessible parts equally vulnerable, the questions could be easily solved, since the full-sized hatches (for a modern ship) and the favorable alignment would make the transportation comparatively easy, and the present sick bay and adjoining compartment would answer admirably. But as this ship has, on account of her armor, safe spaces below the berth deck, it is imperative, if possible, to afford the wounded the shelter of such positive protection, and to this end it is proposed to clear away one of the large storerooms on the lower deck and to convert it into a cockpit in time of action. The method of transportation would doubtless be in hammocks with or without the bar recommended by the Department, and with the favorable size and alignment of hatches on this ship the factor of safety would outweigh the additional trouble and suffering caused by passing the wounded one deck lower. The wounded in the turrets should be placed in the chamber at its base and there await treatment. In the crisis of a severe engagement and in the presence of a large number of wounded, the exigencies of the moment would prevent any special plan being carried out, and the wounded would have to be temporarily attended to where they fell.

VENTILATION.

Owing to the relatively small amount of machinery (9,000 horsepower to 6,800 tonnage), more than the usual portion is available for living spaces, and thus it has been possible to make better provision for natural ventilation, and to avoid an intricate and devious plan—always fatal to efficiency—of artificial ventilation. The hatches, in most instances, are of more generous proportions than in most modern ships and are aligned, thus permitting the introduction of wind sails. The mistake was made, however, of using 12-inch Wilson ports instead of 14-inch lateral ports.

In the artificial system it may be generally observed that there are no right-angled or overlapping joints, and that the entire system, being exposed to view, can be easily gotten at and renovated.

The berth deck is ventilated by two 60-inch Sturtevant steam blowers, exhaust or supply, each of a capacity of 10,000 cubic feet of air per minute. The main ducts are 27 by 15 inches, tapering to terminals of 4 to 6 inches in diameter, the openings of which are bell-shaped, covered with wire netting and equal to twice the area of the pipe.

The supply pipes to these blowers are 20 inches in diameter and lead, clear of everything, above the superstructure. The usual limitations of efficiency may be noted, that when the revolutions of the fans are at or above 500 the efficiency has been satisfactory in the main body of the ship, but at the terminal parts, such as well aft or forward, but little effect is noted. However, it fortunately happens that these parts of the berth deck are least in need of it.

Below the berth deck there are nine blowers, as follows: In each hydraulic pump room, two in number, is a Sturtevant blower of about 8,000 cubic feet per minute capacity; in each engine room, two in number, there is a steam direct supply blower of a capacity of 10,000 cubic feet per minute; in the ammunition passing room another Sturtevant blower of about 8,000 cubic feet capacity; in the steam steering engine room are two electric blowers, one exhausting into the hollow military mast, and the other, of little value, stirring up the air in the tiller room, the latter place having no supply pipe from deck; in the dynamo room are two electric blowers, one supply and one exhaust; in addition, the dynamo room has a large wind sail. The fire rooms, two in number, are each ventilated by three cowled 20-inch pipes leading from above the superstructure and expanding in the fire room in large flares. When forced draft is used, though not a direct ventilator, the temperature is much reduced by the extraction of the hot air above the boilers.

All the storerooms below the berth deck are supplied with ducts from one or other of these blowers. The turrets are also efficient natural ventilators, as they extend from above the main deck down to the hold.

The double bottoms and bilges are kept in perfect order, and there has been no possibility of bilge exhalations.

The heat has not yet been excessive or harmful in any of the spaces usually affected in that way in modern men-of-war, such as dynamo room, engine, and fire rooms, but the supreme test of a cruise in the Tropics has not yet been applied.

WATER.

The evaporator is the present design of the Bureau of Steam Engineering; shop-tested capacity said to be 5,000 gallons daily, but the actual output per diem, even under the favoring conditions of temperature since the ship went into commission, has been less than 2,000 gallons. The quality has been unsatisfactory because of a too high percentage of saline matter. I am credibly informed that a larger evaporator is now being built for this vessel. There are storage tanks for 12,000 gallons.

WATER-CLOSETS AND BATHROOMS.

WARDROOM.

In an inclosure just forward of the wardroom bulkhead are 3 Bishop bowls and a porcelain tub. The floor is of cement and stone mosaic. The place is well lighted and ventilated. No odors have been noticed. The tub is of little value, as it has only cold water, and when but one tub is to be used by a large number of officers the certainty of its cleanliness is never assured; a salt-water douche would be preferable. There are 3 set basins, but they are never used.

STEERAGE AND CHIEF PETTY OFFICERS.

In an inclosure on the port side of the berth deck are two sets of lavatories and closets, separated by a bulkhead; the forward portion, for chief petty officers, contains 2 Bishop bowls and a salt-water douche; the after portion, for use of steerage officers, has 3 Bishop bowls and 1 tub.

ENGINEER'S FORCE.

On the starboard side of the berth deck there are 9 salt-water douches and 10 set basins.

GENERAL USE OF CREW.

There are within the forward superstructure 3 salt-water douches, but being incomplete have never been used. The water-closets consist of 2 long iron troughs, starboard and port, fitted with seats, the one pierced with 8 holes, the other with 6. A steam force pump is supposed to keep water flowing at all times through these troughs, but its performance has been unsatisfactory. Steam and hot water are at times forced through the troughs.

CELLS.

These are two in number, starboard and port, on the berth deck, nearly in the eyes of the ship in compartment A 101. The capacity of each cell is 400 cubic feet, and they are each ventilated by a duct from the blower, by perforated door, screen window, and one 12-inch port. The ventilation is satisfactory, but the cells are so cold and so frequently flooded by condensation on the walls that they are not continuously used. The board of inspection has advised the introduction of steam pipes.

ABSENCE OF ICE MACHINE.

Attention is called to the entire absence of any refrigerating apparatus. Neither ice machine, cold storage, nor any other means of reducing the temperature of water in the scuttles exist on board. Without entering into a discussion of the hygienic advantages of the preservation of fresh provisions, of the use of ice in the care of the sick, of the grateful and tonic effect of water at the temperature of 40° instead of 80°, the fact remains that in plain, everyday life refrigeration, which was once considered a luxury, is now a necessity to most of men. The value, almost necessity, of these machines has been recognized by their installation on most modern ships, and their omission from this vessel, where there is abundant room, seems extraordinary, and should be remedied as soon as the opportunity offers.

RÉSUMÉ.

The service of the ship has been thus far under the most favorable conditions of climate and region; no contagious diseases have developed, the percentage of sickness has been small, and nothing noteworthy has presented.

As has been said before, it is too early in the life of the ship to make the final statement; at the same time the very decided advantages of the ship should make one hopeful, in a hygienic sense, of her future. Her comparatively simple and efficient plan; the absence of excessive crowding with machinery and consequent intricate, obscure, and devious passages and pockets, impossible of ventilation; the large initial air space and opportunities for the admission of sunlight and air by natural methods; the artificial ventilation, although imperfect, still comparatively of considerable efficiency. All these will count in the prevention of disease.

The evils of an imperfect general "head," of an insufficient water supply, and of the absence of means of refrigeration can be easily remedied, not being structural and fundamental defects.

REPORT ON THE U. S. S. INDIANA.

By GEORGE P. BRADLEY, *Surgeon, United States Navy.*

During the short time since my joining this vessel, a week after it went into commission (November 27), it has been at the navy-yard, League Island, and is practically still in the hands of the workmen. Under these circumstances and with no opportunity for inspection, I have not even seen any considerable portion of the very complicated system of small compartments that make up a modern ship, and am at present unable to furnish such a plan as would make any description intelligible. Such a plan will, I understand, be issued soon, and at the end of the present year I can probably furnish the Bureau with a full sanitary account of the vessel under various conditions of climate and surroundings, whether at sea or in port.

I inclose copies of letters to the commanding officer regarding certain deficiencies in the sick quarters which had up to that time come to my notice. Most of these defects are still unremedied, but it is hoped that they will be corrected as opportunity offers. The most important of these defects is probably the close connection of the head and sick bay, and I will add that the odor complained of seems to be steadily increasing, amounting at times to a positive stench. It is impossible that patients so unfortunate as to be confined to their cots for any length of time should not suffer from this cause. The space of the sick bay is also very limited, not allowing more than three cots to be comfortably swung.

As regards hygienic surroundings of officers and men, I would say that apart from unavoidable crowding of men in the crew spaces, which may be considerably improved by utilizing more compartments and passages, and which the very good system of artificial ventilation renders less dangerous than might appear, the comfort of the entire personnel seems well secured.

During our stay in the Delaware River it has come to my knowledge that many of the men were in the habit of surreptitiously using the river water to drink, disliking the occasional warmth and insipid taste of the distilled water, which is plentifully supplied and of excellent quality. This is exceptionally dangerous in this locality, as it is believed the germs of typhoid fever exist in it. The single case of typhoid occurring was probably, however, not due to this cause, and so far no further cases have developed, but there seems reason to believe that some of the cases of diarrhea may have been caused thereby. Representations have been made to the commanding officer, and I have caused the men to be warned of the risk, and it is hoped the practice may be discontinued.

The large sick list prevailing has been due chiefly to climatic causes, acting upon a crew recently assembled in a ship still practically unready for service and ordinary routine, but also, it must be said, to the presence of many persons unfit for life on a cruising ship. A certain number of cases of measles added to the hospital list. The first case was manifested a few hours after the patient joined the ship, and the other five were the result. As at the moment of writing this report (January 7) no cases have occurred for several weeks, it is hoped the disease has come to an end, perhaps from lack of material.

The largest number of cases of individual disease are of diarrhea and tonsillitis, 7 and 8, respectively, and many other cases of the former occurred and were treated, but not of enough severity to require relief from duty. One probable cause of this frequency has been referred to; the other, applicable to both diseases, and perhaps the most powerful, is climatic exposure, aggravated by the presence of workmen on board and the constant drafts resulting in all parts of the ship.

As usual, one or two cases of rheumatism, obstinate ulcers, and results of injuries gave the largest proportional number of sick days.

On the whole, there seems no reason to suppose that with change of climate or weather the sick list should not become normal.

When opportunity offers, a thorough and careful examination and report will be made of the ship in its sanitary and hygienic relations.

DEFICIENCIES IN SICK QUARTERS.

1. *Sick bay.*—The sick bay bathroom is unprovided with hot water. This is a very important deficiency, as hot water, for baths and applications, is constantly needed in the treatment of disease. The deck of the bathroom, covered with some sort of cement, is very rough and corrugated, and can hardly be kept clean; it might be overlaid with another coat and made smooth. Some of the valves of the water-closet leak, and flushing is defective. The ship's head is in close proximity to the sick bay, and the odor from it is at times offensive; in summer or hot weather and at sea this might be a serious danger to the sick. It is suggested that the ventilating holes in the fore and aft bulkhead of the sick bay, through which these odors come, be closed. There are needed in the sick bay a small stand on which the antiseptic box may be placed and secured above the deck, a shelf as high up as possible on which to place jars of antiseptic fluid for irrigating in surgical cases, and a stand for the portable electric light.

2. *Storeroom.*—The padlock on the storeroom can be opened by the keys of many other compartments. I would request that a special Yale padlock be substituted.

3. *Dispensary.*—A wooden rack for graduates is required for their safety in a sea way.

Attention is called to the fact that the carpenter shop adjoins the sick bay and renders it impossible to secure even the ordinary quiet, and makes a medical examination difficult, sometimes impossible.

The ventilating holes in the bulkhead on the port side should be stopped up to prevent the odors from the head passing into the sick bay. An additional reason has been shown during cold weather, when, with the steam heaters working to their greatest capacity, the temperature has fallen below 60° F., while the smell from the head has been worse than ever, owing to the closing of hatches on the forecastle.

In the dispensary, which is without steam heat, water was frozen in the pipes. A small coil might be advantageously placed there.

REPORT ON THE U. S. S. CHARLESTON.

By C. U. GRAVATT, *Surgeon, United States Navy.*

At the beginning of the year the ship was at Chemulpo, Korea, but proceeded to Nagasaki, Japan, about the middle of January, where a visit of one week was made; then Chefoo, China, via Chemulpo, was reached; from Chefoo brief visits were made to Wei Hai Wei, Port Arthur, Talienwan, and Niuchwang, China. The return to Nagasaki was made in the early part of May, where the ship has remained ever since owing to broken machinery.

Two epidemics of influenza occurred; one in the spring, the other in the late autumn. The earlier cases of the first epidemic were naso-bronchial; the later ones nervous. In the autumnal epidemic the nervous type was replaced by the intestinal form. Some of the cases were severe, but no bad result followed.

Cholera appeared almost simultaneously in many places in Japan in the early part of June, and rapidly became epidemic over the greater part of the Empire. A marked subsidence occurred early in October immediately after a general and violent atmospheric disturbance, which lowered the temperature to 50°–55°, the point at which germination is supposed to cease. A high mortality rate prevailed throughout the epidemic. The total number of cases reported was 56,582; deaths, 39,975. The greatest virulence was from August 17 to 24, when over 700 cases and 400 deaths occurred daily.

In Nagasaki there were 259 cases and 210 deaths, and in the surrounding ken (corresponding to one of our counties), 1,475 cases and 998 deaths.

No case occurred on this ship, though several foreign men-of-war, merchant ships, and Japanese transports were attacked. Preventive regulations were as few and as simple as possible, and consisted of stopping liberty to the crew and requiring all articles of food to be well cooked. The only prohibited articles were such as are ordinarily eaten raw, ice in drinking water, and fish. Washing was done on shore; but one laundryman did it all. Officers were allowed to go ashore as usual under instructions to observe the same dietetic regulations as obtained on board ship and to avoid districts of the city known to be infected, though this was difficult, as a map of the town on which the locality of cases was dotted, showed them to be much scattered.

A not very well-equipped hospital for the accommodation of city patients has been established at the head of the bay, and near the entrance to the harbor the Government has provided a well-appointed and well-managed quarantine hospital, where very good success in treatment was had. In one series of forty cases, not selected, there were but two deaths. They discard opium and rely principally upon camphorated brandy, though Cantani's method is sometimes employed. The disease was worse in Osaka (a crowded city built on a low plain with several sluggish streams traversing it) than at any other port, and milder in Tokyo and Yokohama, where sanitary measures are more thoroughly carried out than elsewhere.

LIVING SPACES.

These comprise the cabins, officers' quarters, the berth deck, the two torpedo decks, and sick bay. The space allotted to officers is greatly out of proportion to that for the crew and is more than they require. Thus rather more than half of the entire berth deck is given to the captain, fourteen wardroom officers, an unfixed number of junior officers, and two warrant officers. The aggregate crew space on the berth deck, all of which is, of course, not available, is 26,211 cubic feet, affording 144 cubic feet per man for 211 occupants. The crew complement is 281, 70 of whom are now billeted on the two torpedo decks, which are fortunately available for berthing, as no torpedo outfit has been provided. Even with this relief the berthing space is so crowded that servants have to find lodging where best they can, and should torpedo fittings be supplied at least 40 more men would be assigned to the main crew space, reducing the cubic allowance per man to 104 cubic feet.

It would therefore be advisable, for the efficiency of the ship, to make such alterations in her internal arrangements as would secure an increase of berthing space for the men. No quarters for officers should, in my opinion, extend farther forward than the forward engine room hatch trunk.

HEATING.

The deplorable condition of the sick bay and forward part of the berth deck and the discomfort of the cabins and wardroom officers' staterooms in very cold weather was represented to the Department in February last, accompanied by a recommendation to remove the sick bay aft on the berth deck and to increase the heating apparatus. Regarding the removal of the sick bay, every officer attached to the ship recognized both its importance and the feasibility of the plan proposed, but it failed to meet the Department's approval. Authority was granted to increase the heating apparatus, but owing to certain obstacles it has not been done. The fact remains, however, in the light of past experience, that under existing conditions the ship is altogether unprepared for service in climates where severe cold may be expected.

Sheathing the exposed iron decks fore and aft would do much toward rendering the spaces beneath them more comfortable.

The afterpart of the crew space is made almost insufferable in summer by the galley, and the heat is conveyed to the officers' quarters and even the cabins, so that two-thirds of the living space is rendered uncomfortable by it. For this reason, and also for the purpose of giving more berthing room, it should be removed to the spar deck, under the forward bridge; 2,000 cubic feet would be gained in this way.

The dynamo room is an interior compartment below the protective deck, without any natural ventilation. In order to carry off the overheated air a small electric fan was put in several years ago with ducts leading to the ship's rail. Finding that this did not accomplish the purpose it was suggested when at the Norfolk Navy-Yard that a ventilator be run to the spar deck. Instead, however, two 16-inch vents were cut through the protective deck, making direct communication with the forward torpedo room. A proceeding which resulted in pouring a sufficient volume of hot air in that compartment to render it untenable for sleeping in warm weather, but not enough to materially benefit the dynamo room, where in summer the temperature still averages about 120° with two dynamos in action, and 140° with all three. The proposed ventilator would, it is believed, have proven satisfactory.

ARTIFICIAL VENTILATION.

Three distinct systems are provided:

I. A 55-inch Sturtevant blower located on the berth deck, with conduits supplying the main berthing space, the forward torpedo room, storerooms, holds, magazines, prison, and sick bay.

II. A similar blower on the protective deck amidship for officers' quarters and after compartments.

III. A coal bunker aspirating system, consisting of ducts leading to collecting boxes on either side of the funnel and others ending in vents under the rail.

Observations made with a Casella air meter to determine the actual work done resulted as follows:

Work done by berth-deck ventilating fan.

Compartment.	At 300 revolutions.							
	Cubic space.	Number of occupants.	Number of vents.	Area of vents.	Velocity per minute.	Volume per hour.	Changes per hour.	Amount of air per man per hour.
	Feet.			*Sq. in.*				*Cu. feet.*
Pay office			1	16.5	240	1,562		
Wardroom water-closet			1	16.5	415	2,760		
Steerage water-closet			1	16.5	450	2,970		
Lamp room			1	16.5	225	1,500		
Berthing space	26,211	211	19	16.5	666	44,450	1.7	210
Dispensary	200		1	16.5	175	1,140	5.7	
Sick bay	1,500	(*a*)	2	16.5	158	2,070	1.4	(*a*)
Sick-bay water-closet			1	16.5	210	1,880		
Forward torpedo deck	4,009	35	1	35.4	945	14,160	3.5	405
Prison	825	(*a*)	2	16.5	375	4,920	6	(*a*)
Carpenter's storeroom			1	35.4	1,075	16,080		
Dynamo room			1	35.4	350	5,250		
Torpedo magazine			1	16.5	412	2,700		
Tank rooms			2	16.5	433	5,730		
Bread room			1	35.4	445	6,660		
Equipment storeroom			1	35.4	520	7,800		
Paint locker			1	16.5	140	900		
Paint storeroom			1	16.5	535	3,540		
Forward starboard magazine	662	2	1	16.5	315	2,100	3.2	(*b*)
Forward port magazine	559		1	16.5	180	1,200		(*b*)
Forward starboard shell room			1	16.5	440	2,880		(*b*)
Forward port shell room	1,608	3	1	16.5	265	1,740	1	(*b*)
Total in one hour						136,692		
Estimated capacity of fan per hour						207,000		
Loss by friction						70,308	=34 per cent.	

Compartment.	At 500 revolutions.			
	Velocity per minute.	Volume per hour.	Changes per hour.	Amount of air per man per hour.
				Cu. feet.
Pay office	450	2,970		
Wardroom water-closet	570	3,780		
Steerage water-closet	730	4,800		
Lamp room	260	1,860		
Berthing space	1,077	63,960	2.5	303
Dispensary	210	1,380	6.9	
Sick bay	285	3,750	2.5	(*a*)
Sick-bay water-closet	300	1,980		
Forward torpedo deck	1,460	21,900	5.2	617
Prison	667	8,790	10.6	
Carpenter's storeroom	1,730	25,920		
Dynamo room	525	7,860		
Torpedo magazine	617	4,080		
Tank rooms	995	13,140		
Bread room	725	10,860		
Equipment storeroom	765	11,460		
Paint locker	210	1,380		
Paint storeroom	690	4,560		
Forward starboard magazine	720	4,920	7.6	2,460
Forward port magazine	420	2,760		
Forward starboard shell room	885	5,820		
Forward port shell room	482	3,060	1.7	1,020
Total in one hour		210,790		
Estimated capacity of fan per hour		345,000		
Loss by friction		134,210	=39 per cent.	

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a Variable. *b* Vents closed except at general quarters.

The after system operates less satisfactorily. Upon my joining the ship it was found that its use had been almost discarded because of its supposed connection with the bunker system, a misapprehension which arose from the fact that on several occasions the officers' quarters and storerooms supplied by it had been deluged with coal dust. All the vents had therefore been tightly closed and the blower employed for the imaginary benefit of men in the bunkers. Upon pointing out that the two systems are distinct and that running the blower could give no relief whatever to the men in the bunkers the vents were reopened and the fan has since been operated almost constantly. The trouble was easily explained and is instructive. The fan is unwisely located in a compartment communicating with a coal space and the fan-case door had been left open with the inevitable result of drawing in a quantity of dust. The terminal ducts, in the firemen's washrooms, have been in consequence entirely occluded, those in the warrant officers' quarters nearly so, and the vent currents elsewhere are irregular. When opportunity offers the whole system should be thoroughly overhauled and cleaned.

PRISON.

This is deficient in size, lighting, and ventilation, and hence unsuitable. The only redeeming thing to be said of it is that it was not intended for the purpose. It is an interior compartment on the protective deck, and the only access to it is through a hatch in the forward 8-inch gun support; in consequence of which all the air that reaches it comes from the berth deck, where it has already been vitiated by respiration. The entire compartment measures but 825 cubic feet, and two cells for solitary confinement, of 180 cubic feet each, have been constructed in it, leaving only 445 cubic feet for the accommodation of ordinary prisoners. Naturally, with a crew of such size, it frequently happens that a number of men have to be placed under sentry's charge and otherwise confined. Even one person should not be placed in such an environment for any length of time.

For several months last summer its temperature averaged 88° to 91°. Occupants were compelled to remove all their clothing and were still constantly bathed in perspiration. The effects of confinement under such conditions may be readily drawn. War ships must have prisons, but they should be constructed with a proper regard for sanitation. The place of confinement on this vessel should be where the sick bay now is and sick quarters established aft.

ICE MACHINE AND DRYING ROOM.

For the requirements of the sick and the comfort of all, there should be an ice machine on board, and a drying room for use in rainy weather would prove a very useful improvement. Both could be advantageously installed in the present auxiliary boiler room, as the auxiliary apparatus is, it seems, altogether inadequate for its purpose and practically valueless.

REPORT ON THE U. S. S. TEXAS.

By CHARLES A. SIEGFRIED, *Surgeon, United States Navy.*

The *Texas* is a second-class battleship of 6,400 tons displacement, with two turrets, an armored belt, and protective deck. She is peculiar in design and construction, and, from the medical officer's point of view, presents several features inviting adverse criticism. She is divided into three transverse vertical sections, the parts forward and aft of the central redoubt and turret structure being cut off from each other on the gun and berth decks, and with no communication in action possible except on the exposed spar deck or by the center passage below the protective deck between the engine rooms. Battle hatches and plates prevent communication between these three separated sections of the ship and between the decks in action. Access is possible only from the gun to berth deck forward and aft of the turrets, but not to the upper or spar deck or below the protective deck.

The turrets, each containing a 12-inch gun, are on the level of the spar deck, an armored redoubt extending diagonally from one to the other. There are two 6-inch guns on the spar deck, forward and aft of the flying deck, four 6-inch guns on the gun deck or main deck—two forward and aft of the central citadel—all unprotected, excepting the usual steel shields. The secondary battery is distributed mainly throughout the main or gun deck, four 6-pounders being well aft in the officers' quarters; also a number on flying deck, in battle tops, etc. All told, the battery consists of 32 guns, eight being in the main battery.

The hull is divided by transverse bulkheads containing large-sized water-tight doors. The engine rooms are longitudinally divided, while the fire rooms are in a series of four deep steel boxes, with long vertical ladders as the means of exit or entrance. The after fire rooms communicate, by a long narrow passage along the boilers, with the engine rooms. As before stated, the ship is divided into three parts by the central intact citadel structure, extending from the water line to the spar deck. Under the protective deck a passageway runs between the engine rooms, connecting both ends of the ship, and is accessible from all decks above and below. On this "center passage" are the central electric station, two dynamo rooms, air lock doors to fire rooms, hatches to the redoubt and berth deck above, and at each end the passage opens into large forward and after ammunition hoist rooms on a lower level. From these spacious hoist rooms open numerous store rooms, submarine-torpedo room, magazines, three prison cells forward, and tiller and steam steering rooms aft.

All the compartments below have steel decks covered with linoleum excepting center passage and redoubt. In the second month of the cruise the linoleum, in great part, had to be removed on account of the rapid putrefactive decomposition of the "fish glue" with which it was put down, rendering the compartments uninhabitable and making men sick. Two hundred yards were condemned and removed. Fish glue is a nitrogenous body, and under the conditions of great moisture and heat putrefaction rapidly sets in. There was considerable corrosion of the decks—due to the acid putrefactive compounds resulting from bacterial action—so that the plates showed pitting in places. The odors resembled rotten cheese, and became intolerable. Fore and aft the spar, gun, and berth decks are of wood. The decks in the redoubt, between the turrets and below, generally are of plate. The bulkheads are of plain heavy plate, and corrugated thin iron in the quarters and living compartments. The only saving in wood by the use of the corrugated iron is in the room and passage bulkheads. There is everywhere in connection with it an enormous amount of cabinet wood in shape of lockers, bunks, bureaus, doors, decks, and a lining at ship's side.

Over the metal the so-called "cork paint" makes a surface at once a resting place for dust and a constant menace to the integrity of the skin in brushing past it or against it, as each particle of cork and paint as now applied hardens into a thorn-like point. In the report for 1894 I called attention to the present manner of applying this cork paint, and I have only to reiterate the fact of its defects from careless workmanship. Put on properly it is all that is claimed for it; as now seen in most of our ships it is a sanitary evil of little protection against condensation of moisture, harboring dirt and dust and all that that implies. It is easy to apply granulated cork correctly; the larger grains at first with a heavy, adhesive substance, and then finer ones to smooth down, so forming an even layer, with paint over all, and through which the metal is not visible and which really does form or answers the designed purpose of a nonconducting covering agent for the metal beneath. Cork in thin sheets is now laid on metal surfaces in some foreign men of war. I have also seen granulated cork applied in the manner above described in some English ships.

THE LIVING SPACES.

These are in comparison with most ships in our service ample, and in some respects superior. They are well ventilated as a rule, naturally and artificially, well lighted, and warmed in cold weather by steam coils. In hot weather they are not excessively warm by reason of the height between decks, the large gun ports and air ports and the high free-board permitting free-air circulation through these numerous openings in the ship's side. There is one forward berth deck compartment—adjoining the redoubt—that is always warmer and darker than the others. Electric lighting furnishes by night ample illumination throughout. By means of thermometric observations taken daily at 6 a. m, 2 p. m., and 9 p. m., in all the living compartments, a record is kept of the temperature and humidity conditions, which are reported to the commanding officer with the morning sick report daily.

Decks are shellacked weekly, excepting only the upper deck exposed to the atmosphere.

The messes have chests, wire lockers, tables, and benches. Large mess vegetable bins are kept on the upper deck in the open air. Commutation of rations is again the rule, and with a small voluntary mess contribution the men have a varied and ample dietary.

The personnel consists of—

Captain and wardroom officers	16
Junior warrant officers and cadets	15
Seamen branch	194
Artificer branch	9
Artificer branch, engineer's department	96
Special branch	9
Messmen	21
Marines	30
Total	390

Capacity of quarters.

Situation.	Capacity.	Number of occupants.	Average per man.
Gun or main deck:	*Cubic feet.*		*Cubic feet.*
Admiral's cabin	2, 912		
Captain's cabin	2, 912	1	2, 912
Upper wardrooms	3, 780	12	315
Upper wardroom country	6, 123		
Berth deck:			
Lower wardrooms	1, 860	6	310
Lower wardroom country	3, 505		
Junior officers' rooms	1, 696	8	212
Junior officers' country	1, 987		
Warrant officers' rooms	703	3	234
CREW SPACE.			
Gun deck:			
Compartment C 110	10, 090	35	280
Compartment A 120	11, 771	88	133
Compartment A 121	13, 796	83	166
Berth deck:			
Compartment D 115	7, 850	16	490
Compartment A 115	11, 880	96	123
Compartment A 116			
Platform deck:			
Compartment A 32M	4, 900	24	204

THE VENTILATION.

Ventilation by artificial and natural means may be said in a general way to be efficient in the living spaces, storerooms, and compartments below, excepting the men's water-closet compartment on gun deck, an inner wardroom stateroom, the redoubt structure, portions of the engineer's department, and hydraulic pump rooms.

The planning of the main general system on the whole is successful, and it is designed to ventilate all parts of the ship below the gun deck, excepting the engine compartments and fire rooms. In this main system the planning and construction of the ducts, joints, seams, bends, and turns, and placing of the louvers are admirable. Two Sturtevant blowers, placed in the redoubt, one on each side, force or extract air forward and aft. The turns in pipes are all smooth curves, and with no obstructing angles or badly designed or constructed sections. The louvers are as a rule properly placed at points farthest removed from doors and hatches. The system works equally well by plenum or extraction, though with slightly better effect by the former method, judging by the quality of the air of the compartments ventilated. Probably by extraction a greater volume of air is moved, and the system was designed to that end, but practically better results are obtained by the plenum method—by forcing purer outside air directly into the compartments.

The main system is in two parts, forward and aft, each with its own blower (in the redoubt), not connected. Diameter of fans, 42 inches; width at outer edge, 17 inches; inlet to center of fan, 27½ inches; outlets to atmosphere, 24 inches diameter. Reversible dampers, but arranged to suit exhaustion best. It is equipped with suitable automatic, butterfly, and special water-tight valves.

An auxiliary system ventilates the two dynamo rooms, central passage, and the 12-inch central magazine and shell rooms, by means of a 30-inch steam fan located in the port dynamo room.

A special system is provided for the dynamo rooms by No. 2 monogram electric fans in each, exhausting the heated air into the forward fire rooms; also for the forward ammunition hoist room to supply fresh air to the dynamo and hydraulic machinery rooms. There are also sheet-iron louvers in branch pipes leading from this fan in the ammunition hoist room, to be used when fan is not running, allowing natural ventilation of dynamo rooms. Fresh air may be delivered at each end of dynamo rooms according as the steam or electric fan is used to exhaust from the room.

Special ventilation for redoubt inclosure is obtained by two No. 4 monogram electric blowers located in the air-shaft casing, extending above flying deck, forcing air toward the turrets.

There is a special ventilating system for the 12-inch central magazine and shell-room lining. This 5-inch space between magazines and boilers is ventilated by a No. 4 monogram electric fan located in central passage. Exhaust pipes lead from this fan into the port after fire room direct. Fresh air comes from pipes connected with the 12-inch ammunition hoists.

Coal bunkers are ventilated by means of exhaust trunks and pipes from each of the lower to the upper bunkers at several situations. Louvers and valves, placed to control the system, keep out dust, etc.

The natural ventilation of the ship is by means of the various hatches, rather small in the spar deck forward of the turrets, 14-inch air ports on both gun and berth decks, and large 6-inch and 6-pounder gun ports pretty generally and evenly spaced throughout the gun deck. Artificial system on gun deck supplies only admiral's and captain's compartments, pantries, and one inner wardroom stateroom. With a few exceptions noted elsewhere, the artificial system is not needed to any greater extent on the gun deck. Shafts communicating with the external air are designed to supply fresh air to tiller and steering engine compartments, forward ammunition hoist room, and submarine torpedo room, and terminate in cowls on the upper deck. The after ammunition hoist room has a supply trunk connected with the engine room hatch. Automatic valves are placed in these shafts where protective deck is pierced. Some of the central 12-inch magazine and shell rooms get fresh air from the hoists; the other magazine and shell rooms get their air from the large forward and after ammunition hoist rooms respectively. These hoist rooms get air also by their hoists by the above-named trunks, and the foremost leads directly into the forward one. The mainmast leads to the central passage.

All the fresh-air trunks terminating in cowls on the upper deck have sheet-iron louvers just under the upper deck, only to be opened in action when the cowls are removed, air supply then coming from the main or gun deck.

The engine and fire rooms have separate ventilating systems. A blower in each engine room exhausts hot air from its upper layers by a horizontal square trunk with several openings. Two blowers in each fire room—eight in all—force the air by means of large square trunks reaching above flying deck to the fire rooms direct. The blowers, of plain type, were furnished by the engine builders and are satisfactory. The system in the engine room should be reversed, air forced in instead of exhausted, and I have no doubt far better results would be obtained. In action, with hatches and ventilators closed, and battle plates in place over the large engine room hatches, the system will be so disarranged that the ventilation of the engine room will be most imperfect, and one must wonder what is to become of those inclosed within. There is but one small louver contained in each shaft alley from the general system, and no other communication is possible with forced-draft steaming. The boilers being in four sealed steel boxes, air to each has to come through the two overhead blowers, which force great volumes of air, taken from above the flying deck near the funnel, through the large square trunks.

Thus far in practice the ventilation of the ship has been fairly satisfactory, with the following exceptions: An inner wardroom stateroom, the men's water-closet compartment on gun deck, the 12-inch magazine room, the dynamo rooms, hydraulic machinery rooms, the engine rooms, and the redoubt structure. It is to me doubtful if any possible system of ventilation in some of these spaces would correct the high temperature, ranging from 125° F. in dynamo rooms and redoubt to 170° F. in hydraulic pump rooms. When the ship is under way the heat becomes excessive, and during the short periods of time when making steam trials last September the number of cases of heat exhaustion treated in one day aggregated twelve. The hydraulic rooms furnished most victims, hence the more thorough covering of the hot metals, pipes, etc., with nonconducting materials becomes imperative.

Ventilation by the exhaust system must give way to the plenum method, forcing the air direct from the outside to the space below. Furthermore, complicated systems of ventilation, one section or part dependent on another, is usually, as in this instance, faulty. Complete, separate systems for sections or parts of a ship, with direct supply of outside air to the compartments, should be the aim of any plan of ventilation. The motive power may be that most convenient to apply to the section under consideration, and may vary within wide limits, the general principles remaining the same and without dependence on artificial means or power. On complicated war ships the somewhat attractive, projected system of cooling and ventilating fire rooms or hot compartments by forced supply of a very dry, heated air appears to me to be impracticable.

It is the close proximity of necessarily hot metals to human beings and rapid heat conduction that causes the distress and rapid vital exhaustion, the usual first effect being failure of the heart and respiration, through the action of the abnormal heat on the brain and nerve cells. Exhaust systems of ventilation induce a supply of partly vitiated and warmed air to compartments far removed from the outside air, air that is deprived of much of its oxygen after filtering down through numerous hatches, passages, decks, and passing over hundreds of square yards of soiled, greasy metals and surfaces before it reaches the man, finally to breathe it under the strain of arduous labor, in an already overheated and confined space or compartment.

THE SICK QUARTERS.

These are located on the berth deck forward between the first and second water-tight bulkheads, in a torpedo compartment, the chains and anchor engine being overhead. Only two cots for sick men can conveniently swing, and leave room for a table and space to move around. A wire cage stows two torpedoes along one side and takes up much of the floor space. The sick bay is also a thoroughfare to the torpedo-tube compartment, next forward in the bow. In the two after-corners of the sick-bay compartment are located the dispensary, on the starboard side, and the bathroom, with tub and Bishop water-closet, on the port side. The bulkheads are of corrugated iron.

Sick-bay dimensions, compartment A 113.

Sick bay proper:		
Capacity	cubic feet..	1,852
Floor space	square feet..	158
Torpedo cage	do.....	36
Bathroom:		
Capacity	cubic feet..	275
Floor space	square feet..	17.7
Dispensary:		
Capacity	cubic feet..	164.5
Floor space	square feet..	11.3

The ventilation is good, and is both by artificial (the main ship system) and natural means. The lighting is excellent. There are three 14-inch air ports on each side of the compartment. The heating by steam radiators is satisfactory.

The medical storeroom is between the berth deck and the top of the curving protective deck, opening by a hatch into the adjoining compartment abaft the sick bay. It is a well-arranged storeroom in every respect, and accommodates all the medical supplies excepting the larger, bulkier articles, like the antiseptic cases, close stool, etc. Two additional lockers in the torpedo-tube room are allotted to the medical department; but this, a damp place, is unsuitable for many of our supplies. A hard-wood locker for surgical instruments is a necessity in the sick bay proper.

As the sick bay is thus virtually a torpedo room, and at best accommodates but from 2 to 4 sick men, there has been allotted the next after and adjoining compartment for the use of the sick, thus giving additional room for at least 6 men, with sufficient room, affording proper isolation and quiet. The disadvantages of this compartment are the chain lockers, which, in the form of steel boxes rising 3 feet above deck, take most of the floor space, and the occasional odors from the chain. A large hatch and three air ports on each side abundantly ventilate this compartment in port, while the main system, by means of two louvers, always exhaust or force the air in.

The bathroom has an air port, one louver, a Bishop water-closet, a small steam radiator, and some appropriate shelving for the hospital gear, buckets, etc. Fresh and salt water are supplied to the tub, and a steam jet for heating water. These bathing facilities are invaluable in the treatment of the sick on shipboard.

THE DISPENSARY.

Upon going into commission, a report on the inadequacy of the dispensary was at once made, but no action was taken by the constructors until another report was made to the board of inspection at the beginning of the year. Its reconstruction was recommended because of the presence of a chest-like bed and mattress in the center of the room; deep, inaccessible lockers; lack of small drawers and lockers; lack of a sink—glassware and utensils having to be cleansed in the bathroom adjoining the water-closet. It has been fitted up more as a stateroom than a dispensary, while the highly placed, broad, closed bunk is an insanitary contrivance and takes up too much space. No less than 10 cubic feet of space was wasted, being inaccessible because of this bunk. A plan for the dispensary fittings, bunk, small sink, and small lockers has been submitted.

SURGEON'S STATIONS AT GENERAL QUARTERS.

From the peculiar division of the ship and the inaccessibility of one part from another in action, we have at present established two stations or bases of medical assistance; one aft, on the berth deck in the lower wardroom, and one forward, in the compartments on the berth deck adjoining the sick bay. Each station has its operating table, medical and surgical supplies, aids-to-wounded contrivances, medical officer, and baymen. Room and space sufficient are contiguous to these stations for stowing injured men fit for transportation there. The stations are, however, not protected, and are in battle wholly exposed to probable early destruction.

The medical officer forward can only reach the personnel fighting the two 6-inch guns on the gun deck and the secondary battery. The medical officer aft can only reach those men in the battery aft on gun deck and the men in the turrets. If, as it is designed to be, all the battle plates cover the hatches, which is necessary (the guns on the upper deck all firing over the hatches), the personnel of two 6-inch guns and the secondary battery on flying deck, the commander, officers, and men on the bridge and superstructure would be without any possible aid from the surgeons; and the battle plates and hatches closing the protective deck shut off from any medical aid about 152 men—those in the ammunition and engineer divisions. It is presumed that means will be adopted or such changes made whereby some communication will be provided—a manhole cut into floor of conning tower and one hatch left off in protective deck beneath the turrets. In hostilities not less than six trained baymen should be allowed the ship, each surgeon to have three as his assistants at the widely separated surgical stations.

INSTRUCTION IN AIDS TO WOUNDED.

It has been my custom for the past two years to carry on regular instruction in the methods and means for rescuing and treating the wounded, upon "first aids" practically carried out. In this I have been heartily supported by the commanding officer, with the result that all the petty officers and a large number of the crew are competent to render first aid intelligently. They are taken in parties of 10 and 12 and given rudimentary instruction upon the plain physiology of respiration and the circulation; how to help a man in shock-fainting, in asphyxiation; how to arrest bleeding; how to carry a helpless man by one, two, or more carriers, and to some the methods of artificial respiration; the use of tourniquets and the first aid packages; compress to wound, and the bandage. It is astonishing to find the interest taken in the subject by the men, and after having had the instruction and done the manipulations themselves for at least three occasions or periods they are considered competent and are reviewed only at long intervals.

In this simple manner about 30 per cent of the whole crew are generally instructed and about 20 per cent particularly drilled, forming thus a large body of real aids to the injured or wounded in battle and a substantial addition to the medical department. There are occasions in the daily routine of ships when the timely presence of a shipmate with such knowledge may save life.

In each gun division about 8 per cent of the men are told off as the regular aids to wounded and are furnished with the red cross bandage to the arm on going to general quarters. These men are well drilled in the customary methods above described. In teaching I much prefer the pure rubber tubing, the simple "Spanish windlass," and their own neckerchiefs for tourniquet use. The orthodox screw and buckle tourniquets in most cases are clumsily and improperly applied.

It is not expected to transport or carry the wounded in action farther away from the guns than is needed to clear the battery space of obstructions, nor can many men be brought to a sick bay or surgeon's battle station. It is obviously wrong to collect the wounded in groups during an action, were such a thing possible, in most ships to unprotected locations at that. Hence it has been my aim to teach that the wounded can not be moved far from where they may fall—from one deck to another, etc.—unless to secure better protection from further injury, from fire, etc.

By all we know, naval actions will be in the future very short and with a high casualty percentage, and it is obvious that first aid must be promptly rendered where men fall; thus there is need in a ship's company for many more hands somewhat competent to render it than is in the power of the surgeon with his assistants in the medical department. After battle the more serious work of the medical department will begin, and the injured must be removed from the ship to hospital facilities and all that that implies, ashore or afloat. It can make but little difference where men may lie and receive first aid and care for the time being, but removal of them to lower decks or to any distance to a ship's sick bay, situated, as many of them are, under chains and far from the batteries in the eyes of the ship, is utterly impracticable and would not be good surgical practice.

According to a ship's type, design, and construction, the placing of her battery, and the disposal of her personnel in action, must be located the surgeon's equipped stations in battle, so that each unit of the medical department may reach and render aid to the greatest number of men in short time. There are no protected quarters or stations available for the surgeon's stations in any of the vessels of our service coming to my notice; hence it must be more advantageous and safer to treat the wounded, for the time being, near where they fall.

In a naval conflict of any magnitude the probable percentage of casualty would be near one-third, 33 per cent, judging from all available statistics (compiled by me in a paper in the Report of the Surgeon-General of the Navy for 1893) since 1865. In a ship with a company numbering 390 men all told, as in the *Texas*, for instance, we would have on our hands within a few minutes of a serious engagement about 130 injured, dead, or dying men. In consequence the ship would be temporarily a hospital, and every endeavor of the remaining part of the ship's company would be toward the comfort and relief of this great crowd of suffering men as long as they were on board. Their stay on board would not be any longer than the time necessary to bring them to hospital ashore or to a hospital ship, and transport would be effected by ample facilities—slings and gear in experienced hands arranged to embrace a large strong cot, removing patients over the side with the minimum of shock and disturbance.

THE WATER SUPPLY.

The ship is insufficiently equipped with evaporating and condensing machinery, and at no time thus far has been able to supply enough fresh water for common daily use. The theoretical capacity of the apparatus is 5,000 gallons per day, with an average practical output of perhaps 2,000 gallons daily when in use. The difficulty relates to defects in piping, location of evaporators, etc. The quality of the water produced has been uniformly good. Storage capacity is also too limited. There is no method of cooling the water provided, an ice machine not being erected, though one is to be provided later. Most of the time since going in commission the ship has depended upon a supply of shore water. This, while not a positive menace to health in our own northern ports, immediately becomes so in most southern and all the West India ports.

The hydraulic machinery in connection with the large guns and turrets is responsible for much of the lost water, as much as 2,000 gallons going to waste on many occasions through defects in the system of piping and joint packings.

The common defects in the construction of the water tanks exist here, their size, location, and defective manholes. I doubt if water can remain pure many days in a receptacle so easily fouled by deck dust and berth-deck air, and with the present method of fitting manholes, their plates and covers. At every occasion of opening one of these manhole plates a perceptible amount of dust and impurity goes down upon the surface of the water. Water tanks should be most carefully located, easily cleaned out, have more secure manholes to avoid soiling, and their total storage capacity should be sufficient to allow of a few days for the aeration of the water before using, in the absence of approved cooling and aerating apparatus. In fitting up tanks, only hydraulic cements can be used with safety, as the red lead sometimes seen is easily absorbed, and may cause disease.

BATHING FACILITIES.

These exist in the admiral's and captain's quarters, for the engineer officers near the engine room, in the junior officers' quarters, and in the sick bay. There are no baths for the wardroom officers or for the seaman branch of the crew. The machinists have a well-fitted wash room, and the firemen and coal heavers a very hot corner under the redoubt, fitted with basins and a single douche. This latter place is never in good, clean condition, as it drains badly, and is in many respects repugnant. Failure to provide bathing facilities for so many of the ship's company should be corrected, in view of the space available in the ship's hull. Space and design have been recommended for a wardroom bath, and for a series of eight douche or rain baths for the seaman branch of the crew forward. Douche or rain baths in small compartments shut off by a half-length lattice or sheet iron, with cement deck, and simple drain, are far better than the usual tubs, especially on shipboard, for the very obvious reasons of economy of water, saving of space, and ease of keep and policing.

WATER-CLOSETS.

Excepting the one Bishop water-closet in the sick bay, the closets are all on gun deck, and of the simple pan variety with a flow of water after use by a screw valve. By a little device of raising the lever permanently by a leathern ring under the knob, thus keeping open the pan, and by a few turns of the screw letting the water run in a small constant stream, all these closets have been converted from an offensive, old-fashioned variety into the constant salt-water flow and cleanly variety.

The men's closets are of the usual pattern, a series of divided spaces over a U-shaped iron receptacle with a constant stream of salt water; hard wood movable seats. The compartment is located in the angle formed by the ship's side and the forward starboard wall of the redoubt. It is not sufficiently ventilated, there being but two air ports, a door to the gun deck, and no forced ventilation. Air shafts have been recommended to lead from the inboard corner and side up through the deck. The deck is cemented.

The firemen and coal passers below should be provided with urinals. The long distance to the regular water-closets, and the character of their work, necessitating a semi-stripped state, would seem to require this measure, besides obviating some well-known nuisances below.

The petty officers are provided with a separate water-closet compartment, and the marine guard of 30 men have also the use of a water-closet, originally designed for the use of the warrant officers, it being situated in the marines' quarters aft of the citadel, on the gun deck.

The junior and warrant officers' and the wardroom officers' water-closet compartments are abaft the redoubt structure on gun deck, starboard side, forward of the officers' quarters. They are ample in size, well ventilated by air ports, and contain porcelain urinals in addition to the bowls. Decks cemented. Adjoining these water-closet compartments are two 6-inch guns, one each side, the admiral's and captain's pantries, their cabins, and finally the upper wardroom officers' quarters, mess room, pantry, etc.

PRISON CELLS.

These are located in the forward submarine torpedo compartment below the protective deck, and the three cells contain respectively 157, 153, and 107 cubic feet of air space. They have each a louver of the main ventilation system of the ship and have good air. But they are very small and the smaller one does not allow a prisoner to stand upright in it. Owing to the small cubic capacity prisoners close the louver because of the air current in cool weather, thus depriving themselves of ventilation. The doors are pierced by numerous openings. If the space now occupied by the three cells were used for two it would be far better for the physical welfare of prisoners. The smaller cell is only used in rare cases.

REPORT ON THE U. S. S. MINNEAPOLIS.

By D. N. BERTOLETTE, *Surgeon, United States Navy.*

The vessel is a steel protected cruiser of 8,050 tons displacement. The crew consists of 462 men, official complement, of which 202 belong to the engineer force.

During the year there were 3,639 sick days. Eleven cases were invalided to hospital. There were no deaths. At but one port away from the United States was liberty given, Kingston, Jamaica, and although some of the men contracted venereal disease (principally syphilis) there, it is not fair to ascribe particular danger to that port.

There was an unusual number of catarrhal affections, excluding diarrheas, due to the insufficient protection afforded by the living spaces in the ship. The sides of the ship are made of thin steel plates, with no appliance to prevent the rapid conduction of heat, serving only as a protection from rain and sea, and does not permit of warmth in cold weather. The staterooms occupied by the officers while in New York and Philadelphia during winter weather were uninhabitable, and although an attempt was made to remedy the defect by lining the ship's side with a thin layer of felt it was only partially successful.

The sick bay is spacious, located near the water line in the bows of the ship, has a floor area of about 600 square feet, is well lighted by six 12-inch air ports, and is connected with the artificial ventilating system of the ship. There is also a ventilating cowl on the forecastle, with a trunk extending down to the sick bay. By means of movable clamp hooks, two cots and about six hammocks can be conveniently slung. In one corner of the apartment there is a commodious bathroom, 6 by 7 feet, containing a large bath tub, lavatory, and water-closet. The bath is supplied with both fresh and salt water. The dispensary is located on the deck above, in the waist of the ship, a considerable distance from the sick bay. It is 6 by 10 feet in size and is supplied with a lavatory and fresh water. Both dispensary and sick bay are connected by electric bells with the surgeon's stateroom.

The means for artificially ventilating the ship are four centrifugal blowers, Sturtevant make, 60 inches in diameter, connected by means of large metallic ducts with the storerooms, holds, and living spaces (excepting the main deck). The openings from these spaces into the ducts are circular grated louvers 6 inches in diameter, half of the area of which is taken up by the shutter, so that when fully open each has an area of 10 square inches. In the officers' rooms the louvers are placed near the inboard bulkhead in such a manner that they do not operate to the best advantage, being so close to the grating communicating with the passageways that instead of removing the air from the room they take it from the space outside, leaving the air over the sleeping places practically undisturbed. The ventilating apparatus is so arranged that it can be used either to exhaust the air from the ship or, by reversing, to force fresh air in from the outside. The engine rooms and the compartments containing the distilling apparatus and the machinery for producing electricity have independent blowers.

Besides the connections with the "blowers" the coal bunkers have a connection with the spaces between the large smoke pipes and their casings, the heated air in which produces a mild updraft and is supposed to exhaust the air from the bunkers, fresh air being supplied through six grated openings on the main deck. When the bunkers are filled with coal there is probably no movement of air.

In addition to the 198 water-tight compartments of the ship there are 17 compartments forming the double bottom. These would be completely closed spaces, except for a small pipe, which opens into the air above the water line. These spaces are entered frequently by men to clean, dry, and paint the metal. The same men are detailed repeatedly to do this work, but so far no deleterious effect upon them has been noticed. Certain precautions are taken before entering these places to determine the respirability of the contained air. A portable electric blower is available for ventilation if necessary. The lights used are portable electric lamps. No cases of lead poisoning have been noticed.

The crew are berthed as follows: In four small gunrooms (bulkheaded spaces in which are some of the smaller guns of the battery), 15 billets; in two larger gunrooms (known as "petty officers' rooms"), 14 billets; other spaces on the gun deck, 109; berth decks, forward, 53, and main deck, 274. On the main deck each man has about 132 cubic feet of space, and in the other parts of the ship approximately the same. The main deck, however, is without any means of artificial ventilation, and when all the men are in their hammocks, especially in bad weather, when all the air ports are closed and the small hatches leading to the upper deck have their hoods on, the atmosphere becomes very foul. This lack of efficient means for ventilation is accounted for by the idea that this covering for the main deck was an afterthought in the construction of the ship, and was only added after the rest of the structure had been practically completed and its general internal arrangements provided for.

The warrant officers, junior officers, and wardroom officers occupy the usual staterooms, having a floor space varying from 60 to 75 square feet, the ceiling being 7.5 feet high. The inboard bulkhead which separates the room from the passageways is slatted and at the top, the whole width of the room, has a wide-meshed wire netting 7 inches wide. The mess rooms are large and do not communicate directly with the staterooms. The commanding officer's quarters, lately divided in two for the accommodation of a flag officer when he may be attached to the ship, occupies the stern of the vessel for 72 feet of its length, having a deck area of 1,584 square feet, divided into the usual saloons, staterooms, and offices. These quarters are very uncomfortable from the shaking of the stern and the noise made by the propellers when under way.

The lavatories are numerous and well arranged. There are stationary basins for hand washing and numerous shower baths, especially in the firemen's two washing rooms. The officers have lavatories, standing bath tubs, and shower baths, besides the large shallow tin bath tubs supplied for each stateroom.

The water-closets for the officers are of the hopper pattern, with good flushing arrangements, and are conveniently located. The "head" for the men is in two divisions, one on each side of the ship, well forward on the gun deck, with separate urinals. They are of the "trough" pattern, and being smaller and of less capacity than is required, they can not always be kept perfectly clear and clean, and then fecal odors are carried to neighboring compartments.

The decks below the main deck are all shellacked and can be readily cleaned with a damp swab. The main deck is of bare wood and is a large proportion of the time more or less damp from the frequent washings necessary to keep it clean, or approximately so, and, as the part under the superstructure is the living place for the crew—indeed, the only place for them to go when not on watch—this dampness must have a greater or less effect upon their health. Arranged as this ship is, there is very little space where the crew can spend their leisure hours in the open air, and they have, consequently, a much less ruddy appearance than would be expected in men living a supposedly outdoor life.

One great source of disease is avoided by the exclusive use of distilled water for drinking and cooking purposes. There are two Baird evaporators, having a nominal capacity of 10,000 gallons per diem, with a very efficient aerating and cooling apparatus, so that the product can be used almost immediately and never has any oily or nauseating taste.

There is an Allen dense-air ice machine with a nominal capacity of 1 ton per diem, which is connected with a cold-storage room and the ship's scuttle butts and with freezing tanks which produce a good supply of ice for general use.

The ship is heated by steam coils, but owing to the conductivity of the thin metallic sides they are not sufficient in severely cold weather. In mild and warm weather the heat from the engines and boilers makes the whole ship uncomfortable.

Nothing but electricity is used for lighting. The "plant" is a very good one and the supply of light is liberal and efficient.

During the year the ship's crew have been exposed to great extremes of temperature besides the usual variations of climate, as shown in the following account of the ship's movements during that time. From the time of going into commission, December 13, 1894, until February 27, 1895, they were exposed to the inclement weather of winter at the League Island Navy-Yard, New York, and Newport, then suddenly changing to the tropics, the cruise among the West India Islands and along the Spanish Main lasted until April 30, after which the time until August 9 was spent at the Norfolk Navy-Yard, where certain alterations in the ship were made; then, after a short visit to Boston, the ship took part with the rest of the North Atlantic Squadron in a series of fleet drills between the latitudes of Long Island and Cape Henry until November 5, when some minor repairs were made at the Norfolk Navy-Yard. On November 27 the ship started for Asia Minor, reached Gibraltar after sixteen days, stopped there eight days to take in coal, and then proceeded to Alexandretta, Turkey, arriving in six days, and at the close of the year was still at that port.

Of the ports visited Norfolk is said to have produced a number of cases of malarial disease, the usual history of vessels lying for any length of time at certain wharves of the navy-yard there during the summer and autumn months.

The town of Alexandretta is built upon a low, flat plain, formed by the detritus washed down from the mountains behind; the houses are low, damp, and crowded together; the population, said to be 5,000, is a mixture of various Mohammedan peoples and Armenians, none in very affluent circumstances. West and south of the town is an extensive marsh, and it is said that the inhabitants suffer very much during autumn and late summer with malarial diseases. There are no hospitals. There are several Greek physicians in the town, who, however, apparently attempt only the simplest kind of practice. Severe surgical and other cases, when the individual can afford the means, are taken to Beirut for treatment. Quinia and arsenic are the remedies commonly used for the treatment of the malarial diseases prevailing in this locality.

REPORT ON THE U. S. S. RALEIGH.

By E. Z. Derr, *Surgeon, United States Navy.*

There were 196 admissions and 1,569 sick-days during the year. There were 51 cases of malarial fever, and 383 sick-days are attributable to that cause. Seven men were overcome by exposure to heat in the fire rooms. The cases were not serious and quickly responded to treatment. In view of the high temperature of the fire rooms the wonder is that so few of the engineer's force have succumbed. As regards cleanliness, the sanitary condition of the ship is good. The bilges, heads, and water-closets receive careful attention, and disinfectants are liberally used.

VENTILATION.

The following defects in ventilation have been reported and recommendations made:

1. *The fire rooms.*—The changes made in the ventilation of the fire rooms, referred to in last year's sanitary report, reduced the high temperature in those compartments, but even under these improved conditions the thermometer sometimes registers as high as 178°, and 160° F. is a frequent temperature while steaming in warm weather. Working in such heat may in time impair the efficiency of the engineer's force, and lay the foundation for future physical ailments. It has been recommended that the ventilators leading to the fire rooms be increased in number, and, if that be impossible, the diameter of those now in place be enlarged.

2. *The forward berth deck.*—In my communication to the commander in chief, dated August 28, 1895, I reported on this deck as follows:

> At sea this deck is inadequately ventilated, and the after compartment of it overheated by the dynamo room below and by the heat emanating from the fire-room space. Making the voyage from Colon to Kingston, during the month of April, the temperature of this compartment of the berth deck, taken at 3 p. m., averaged 101° for three days. During the trip from Key West to Tampa, in the month of June, the temperature taken at 10 a. m. averaged 97°. This condition of affairs can be improved by increasing the number of ventilating registers on this deck and by enlarging the ammunition hatch on the forecastle so as to permit the passage of a windsail. At present the sick-bay hatch is the only one through which a windsail can be passed to the forward berth deck. This hatch is situated but 24 feet from the stem of the ship, and during heavy weather must be closed, thus cutting off all natural supply except that which passes through the hatches under the forecastle. By enlarging the ammunition hatch, which is 84 feet from the stem of the ship, a windsail can be used in any kind of weather. The dimensions of this hatch at present are 20 by 30 inches. By increasing the breadth 10 inches a windsail can be passed. If feasible, the dynamo room should be supplied with a ventilating shaft communicating with the upper air. This would reduce the temperature of this compartment and, incidentally, of the berth deck above.

During our stay at the Norfolk yard the recommendation to enlarge the hatch was acted upon and a windsail can now be shipped whenever required.

3. *The after berth deck.*—This deck is also inadequately ventilated while at sea. The single hatch leading to it is situated so far beneath the poop that a windsail can not be used, and the artificial ventilation, by four registers only, is insufficient to compensate for the lack of natural ventilation when the ports are closed. The number of registers should be doubled.

4. *The water-closets.*—When the ports can be kept open the ventilation of the closets is excellent, but when it becomes necessary to close them, which is usually the case at sea, the ventilation is insufficient and noxious vapors accumulate in spite of every sanitary precaution. The two tubes, about 3½ inches in diameter, which communicate with the upper air by a common outlet at the extreme after end of the poop, afford the only exit when the blowers are used for forcing in air. Their dimensions are inadequate and the foul air accumulating in the compartment finds its way to the officers' quarters. It is recommended that these tubes and their common outlet on the poop be enlarged to twice their present size.

HEAT OF THE SHIP.

The following table shows the temperatures of various parts of the ship, taken at 3 p. m. during the month of April, while steaming in the Caribbean Sea:

	April 21.	April 22.	April 23.
	°	°	°
Outside air	81	81	82
Sick bay	82	81	82
Prison	87	89	89
Forward berth deck (after compartment)	105	100	99
Dispensary	91	95	94
Paymaster's office	93	91	90
Dynamo room	108	105	108
Central station	110	110	110
Fore and aft passages	115	117	123
After berth deck	86	86	85
Paymaster's storeroom, forward	85	85	85
Medical storeroom	88	88	88
Paymaster's storeroom, aft (1)	97	97	101
Paymaster's storeroom, aft (2)	96	96	100
Wardroom officer's storeroom, after passage	103	104	100
Wardroom officer's storeroom, after berth deck	99	97	100
Warrant officer's storeroom, after berth deck	105	107	105
Steam-steering room	116	112	120
Engine room	98	105	106
Fire room	170	163	160

From the above record it will be observed that the storerooms in the after part of the ship can only be used for such articles as are not injured by a temperature of 100°.

The dispensary, situated in the after compartment of the forward berth deck, is open to the same objection of undue heat. The difficulty has been obviated by removing all medicines likely to be injured to the sick bay, where lockers have been provided for them. It has been recommended, on the ground of convenience, that the dispensary be moved from its present location and placed in the compartment adjoining the sick bay.

SUMMARY OF THE CRUISE.

At the beginning of the year the *Raleigh* was at the Norfolk yard undergoing completion and preparing for a cruise in the West Indies. On the 21st of January the ship left the yard and proceeded to Newport for torpedoes and remained there until the 25th, after which she returned to Hampton Roads, arriving on the 27th of January. Coming out of Newport a gale was encountered, the first rough weather experienced in the ship, and an opportunity to test her seagoing qualities was afforded. The *Raleigh* is a wet ship in even moderate weather. Going head to sea the forecastle is awash, and the water dashing against the sponsons fore and aft is thrown up over the rail in great masses. The after and amidship gun ports being unprovided with shutters (since furnished), the waves gushed through almost every instant, keeping the spar deck inundated. After taking coal at Lamberts Point, Norfolk, we proceeded to sea, bound for the West Indies, in company, with the *New York* and *Cincinnati*.

On the morning of the 5th of February the ship came to anchor in the harbor of San Juan de Puerto Rico. The health officer came off and announced smallpox prevalent, some 600 cases having occurred since the outbreak of the disease two months before. No further communication was held, and the ship proceeded to St. Thomas, arriving there on the evening of the same day. In company with the squadron Santa Cruz, Martinique, St. Lucia, Barbados, and Trinidad were in turn visited. At the latter place the *Raleigh* was detached from the squadron and ordered to Colon, arriving there on the 11th of March. On March 17 the ship proceeded to Carthagena for coal, returning to Colon March 25, where she was later on joined by the squadron. On the 20th of April the ships dispersed, the *Raleigh* being ordered to Key West. On the way it was found necessary to put into Kingston for coal, and we remained there until April 27, and then continued the voyage to Key West, arriving May 1. On May 10 sailed for Savannah, and remained until May 25, after which we returned to Hampton Roads. On June 8 left for New York, where the ship stayed but three days, orders being received to return to Key West. From June 19 to July 18 the ship remained in Florida waters. We then sailed for Boston, where the ship remained eight days, two of which were devoted to the Naval Reserve. On the 3d of August arrived at New York, remaining until August 9, and then proceeded to Newport to join the North Atlantic Squadron for a summer cruise along the New England coast. The squadron visited Bar Harbor, Portland, Boston, Fishers Island (where some days were spent drilling on shore), New York, and Hampton Roads. From September 28 to October 26 the squadron was engaged maneuvering in the Roads and off the capes of Virginia. On the latter date the *Raleigh* proceeded to the Norfolk yard for repairs, and remained there until the 20th of December, when orders were received to rejoin the squadron at Fort Monroe.

During the cruise in the West Indies I visited the hospitals at the various ports touched. The colonial hospital at Port of Spain, Trinidad, is by far the largest and best appointed, and can accommodate about 600 patients. The leper hospital, situated some distance out of town, accommodates about 220. All varieties of the disease were observed, but the tubercular seemed to predominate. Patients are allowed to come and go as they please, and no effort is made by the Government to segregate them. The cases on the island are numerous, but confined almost exclusively to the negro and Hindoo elements of the population.

No yellow fever was met with during the cruise, but the disease broke out at St. Lucia a short time after our departure. During our stay the health authorities denied the presence of yellow fever, but the precaution was taken to give no liberty to the men.

REPORT ON THE U. S. S. LANCASTER.

By C. G. Herndon, *Surgeon, United States Navy.*

This ship was commissioned on September 12, at the New York Navy-Yard. The wardroom officers began to live on board at once and the warrant officers a few days later.

The outfit of the medical department was received on board on the 13th.

A crew of 96 bluejackets and 25 marines came aboard on the 16th. A draft of 144 sailors and marines for the South Atlantic Squadron was sent aboard later, bringing up the total complement to 317 officers and men.

The ship remained at the navy-yard until October 22, when she proceeded under steam, through Long Island Sound, to Newport, R. I., for torpedo outfit.

On November 4 she sailed, fires being hauled as soon as the coast was well cleared. Funchal, Madeira, was finally reached on December 25, after a fifty-two days' passage, during which the ship sailed 5,572 nautical miles.

With the exception of changes in the battery and the installation of an electric plant for signaling and for search lights, the ship is the same in general outfit as during her two preceding cruises. Owing to reductions in number of officers and men now on board over previous commissions when serving as flagship, there is no overcrowding.

No diseases of an epidemic nature have been encountered. Only one severe accident has occurred; an ordinary seaman sustained a fracture of the right leg with severe contusions of soft parts while coaling ship from lighters at Funchal. He, together with a seaman having severe pneumonia, was left at the seamen's, hospital, Madeira. No deaths.

The medical supplies, with a few exceptions, are most satisfactory.

I can not accord too much praise to the tablet triturates and hypodermic tablets supplied by the Bureau, and I most strongly recommend the substitution of these preparations in all cases where medicines can be so prepared over drugs in bulk. Our experience in this connection emphasizes the necessity for having these useful preparations. For about forty-seven days during the late passage of this ship from Newport to Funchal the dispensary balances could not be used at all, owing to the ship's motion. Standard solutions of corrosive sublimate and boric and carbolic acids are kept ready for use in the irrigation bottles and serve a most useful purpose. I would recommend that the rubber tubes attached to these bottles be not less than 20 feet long so as to obviate the present necessity of bringing the sick or injured man near the bottles. In the hospital stores, the extract of beef, clam and chicken soup, and mutton broth are very useful, particularly when the extracts and soups are used together with stale bread or biscuit crumbled in. None of our sick have liked the kumysgen.

The surgical outfit is undoubtedly the best issued in any navy.

We are much in need of the Bureau's apparatus described in Department's General Order No. 452, July 13, 1895, as reference to the following case will show: Much difficulty was experienced in bringing below on December 27 the man with the broken leg. He was a large, heavy person, and as soon as his friends working near him on deck saw he was seriously injured, instead of notifying a medical officer and waiting until the nature of the injury was determined, five of them, with the best intentions, grabbed him, one at each limb and one at his head, and rushed him through two hatches and down two ladders. I was in the sick bay when he was brought in, and the man's agony from the rough handling his broken leg had received was very great. The use of the apparatus would have simplified matters very much. It was even more needed when we hoisted out the two men sent to the hospital in Madeira.

SICK BAY.

The sick bay is situated on port side of berth deck just forward of evaporating room and directly opposite the chain pipes leading to chain lockers. A 5-inch gun is on the gun deck overhead. The only thing favorable that can be said of this site is that it is rather less objectionable than the old position in the bows. The dispensary is just forward of the hospital. There are three air ports in bay and one in dispensary. By crowding, six hammocks can be slung in hospital. The storeroom is on the after orlop. A very excellent position for the hospital exists on the port side of the gun deck abaft fourth broadside gun. This space at present time serves no useful purpose, but would answer most admirably for a hospital site, as light, pure air, sunshine, and quiet could all be obtained at sea. In warm weather, with steam on for propulsion or distilling and berth deck air ports necessarily closed and watch below, the atmosphere in the present hospital becomes rapidly fetid and necessarily positively injurious to sick men, to say nothing of its effects on the hospital attendants. Fortunately since sailing from Newport, R. I., we have had only two severe cases of sickness, one of continued fever and one of pneumonia. Both of these men were berthed on the gun deck. A very significant fact occurred in connection with the fever case. The man, a young marine, had been slung on the after part of the gun deck, where he proceeded rapidly to convalesce. We then moved him back to the sick bay, but had no sooner done so than his temperature began to increase rapidly. Again he was moved to the gun deck and kept there until he fully recovered.

SEAMEN'S HOSPITAL, MADEIRA.

This hospital is a small, well-conducted establishment, very prettily situated in Funchal, on high ground overlooking the anchorage. The hospital was established in 1883 and is maintained by donations and the very moderate charges exacted of the patients. Twelve to 15 can be accommodated, and usually 50 cents to $1 a day covers the charges. An English physician resident in Funchal is in medical charge, while the domestic affairs and nursing are under the charge of a matron, an accomplished professional nurse from Holland, who resides in the hospital. Dr. Brathwaite and I both visited the place and were much pleased with it. Ample grounds, well shaded, afford good facilities for out-door exercise for convalescents.

Ship sailed December 31 for Montevideo, Uruguay, via Porte Grande, Cape Verde Islands.

APOTHECARIES AND BAY MEN.

Attention is respectfully invited to the following paper by P. A. Surg. F. G. Brathwaite, U. S. N.:

The prospective work of this ship is, as far as can be ascertained, that of a gunnery training ship, which would apparently necessitate her retention for a longer or shorter length of time on the home station.

For this reason, and on account of her commodious quarters and ample berthing space, her suitability as a ship for the instruction and training of junior medical officers, apothecaries, and bay men is suggested. The inappropriateness, necessitated by existing conditions, of having assistant surgeons perform their first sea duty without any previous knowledge of the conditions maintaining on a sea-going man-of-war, or of their duties on shipboard, has been duly recognized. These disadvantages have been greatly lessened by the establishment and maintenance of the school for instruction, which by its course has served to acquaint and familiarize the junior medical officer with the routine of the service, his duties, the various official forms, and communications, as well as with a great deal of professional clinical work most necessary to qualify him for his future career.

But the conditions with which he is to be brought in contact, and with which he must be able to cope, pertaining to his duties on board ship, he can not become intimately acquainted with other than by actual experience.

Under existing conditions, and by virtue of the situation, the assistant surgeon on his first cruise on a man-of-war is suddenly called upon to exercise his professional and official qualifications in an atmosphere totally novel to him and under conditions the appreciation of which previous experience offers to him no aid.

The suitableness of this ship for the purpose of presenting to the junior medical officer, after completing his course at the school for instruction, an experience on shipboard, together with instructions at the same time in the various duties, drills, etc., and with the problem of naval hygiene, is suggested.

The establishment of a hospital corps has been recognized as a most desirable means for the maintenance of efficiency in the Department of Medicine and Surgery of the Navy. To obtain that degree of efficiency in a measure corresponding with the advance in the sciences, it is evident that a high degree of organization must be accomplished.

It is extremely difficult, if not impossible, to obtain a high degree of efficiency in the medical department unless proper attention be paid to the execution of the instructions of seniors by their subordinates in an intelligent manner. The rating of landsmen to bay men without any preexisting qualifications in an individual entitling him to act in the capacity of nurse on board ship or the appointing of civilians at low rates of wages as nurses in naval hospitals is not conducive to the efficient execution of instructions of medical officers. Apothecaries, no matter how excellent as pharmacists, are not efficient in their position without some previous knowledge concerning the routine of a man-of-war and discipline.

Junior medical officers can not be expected to be immediately efficient on their first duty aboard of a man-of-war, when to them the technique of various drills, their stations in important emergencies, and their military relations in connection with official acts and individuals are matters of pure guesswork and accomplished as a result of individual and comparative observation.

With the view that such a plan might be desirable and feasible, it is suggested that this ship offers unusual advantages as one on which junior medical officers might first become familiar with the duties of a medical officer on board of a man-of-war, and that apothecaries recently appointed and bay men newly enlisted might, with equal advantage, be instructed for a time preparatory to their cruise on a man-of-war.

During the last few months, since this ship has been in commission, the apothecaries and bay men have been instructed in their duties in connection with the routine of the sick bay; also in first aid to the wounded and their transportation and the general principles of nursing, bandaging, and hygiene.

Instruction has been restricted to those subjects which are of practical value to apothecaries and bay men, and has been given in morning instructions five days in each week.

The subjects and their manner of division have been as follows:

Monday.—Cleanliness: Of sick bay, the body, instruments, dressings, vehicles, etc. Asepsis. Antisepsis. Drinking water: Tests, quality, contamination, filtration, and sterilization. Stations and duty in "Arm and away."

Tuesday.—Air: Impurities. Ventilation: Of sick bay, wards. Temperature. Transportation of the wounded on shore and aboard ship. Stations and duty in "Abandon ship."

Wednesday.—Food: Cooking. Beverages: Preparation. Emergencies: Coma, syncope, fit, bandaging. Station and duty in "Battalion."

Thursday.—Clothing. Excreta. Disinfection. Deodorization. Resuscitation: Of apparently drowned. Aids to the injured. Stations and duty in "General quarters."

Friday.—Prevention of disease. Service of the sailor and soldier. Instruments: Care, etc. Emergencies.

It is believed that the efficiency of our nurses in hospitals, of the average bay man, and of many of our apothecaries, as far as intelligent attendance upon the sick and injured and in operative work is concerned, is not up to the desired standard.

Medical officers are handicapped in their professional work by inefficient subordinates, largely through lack of training. As an offset to this condition, it is believed that a general course of training for these subordinates, systematically carried out, would be, should it be deemed practicable, productive of greatly increased corps efficiency.

REPORT ON THE U. S. S. MARBLEHEAD.

By E. H. Green, *Surgeon, United States Navy.*

For the year 1895 the *Marblehead* has been attached to the European station, with the exception of the months of January and February, which were spent at the Norfolk Navy-Yard undergoing repairs. With reference to the internal hygienic conditions of the ship as regards ventilation, etc., and the ship's complement, there has been no change that would call for amendments in the sanitary report submitted last year.

The absence of a suitable sick-bay has been keenly felt, as an epidemic of gastrointestinal "grippe," or remittent fever, added many very serious cases of illness to the sick list. The first berth deck compartment had all the faults strongly exemplified that attention was called to in my last report. In the first place, being a passageway to several important storerooms, being the torpedo room for the bow torpedo, and being directly under the anchor chains, there can be but little quiet or rest for a sick man. When the ship last summer (July 18) was brought to anchor in the harbor of Copenhagen one of the patients, who had reached a crisis in his illness, where quiet was a great factor in his treatment, became violently delirious from the working of the chains over his head in mooring the ship. This compartment has been flooded on two or three occasions by the seas, that were shipped over the bow, finding their way down the ventilators and hatches. I consider the absence of a suitable sick-bay on this ship as a great defect.

During the first quarter a mild epidemic of grippe occurred on board. There were 20 admissions to the sick list, of whom 19 were discharged to duty and 1 sent to hospital. The whole number of sick-days for the 20 cases only amounted to 113. The disease was the ordinary type of bronchial catarrh with the myalgic symptoms and a low fever. Beginning the latter part of June and running through the whole of the third and fourth quarters, a more serious epidemic occurred, which had the type of a remittent fever, but was a "grippe" of the "gastrointestinal" variety. There were admitted altogether 21 cases—the first one on June 15; the last on September 21. Thirteen of these cases were sent to hospitals—3 in Copenhagen and 10 at Gibraltar. The whole number of sick-days of those treated on board amounted to 840, not inclusive of the 13 patients who were sent to hospitals.

The disease was an infectious one of an indefinite period of incubation. The exciting cause of the attack was doubtless the using of the polluted waters of the Elbe River and of the Neva during the stay of the ship at Hamburg and St. Petersburg. This water was used to wash down the spar deck and in limited quantities in wiping up the berth deck. The germ of the disease probably existed on board prior to that. The onset of an attack was never sudden, but the patient declared he had been feeling badly for days, and in some instances for weeks. They would usually complain of weakness and loss of appetite, with pains in the head, back, and limbs. The digestive system was profoundly disturbed, a heavily coated tongue, in some instances dry and cracked, with sordes of the teeth presenting a typhoid appearance; the abdomen wholly flaccid and free from tympanites and no petechiæ; the bowels in nearly every instance costive, and obstinately so.

The nervous system, except in one or two cases, was not much disturbed; a persistent headache for a few days and some insomnia. In only one case was there delirium. In that case the nervous symptoms were of a low typhoid character. The majority of the patients were bright and cheerful even at the height of the disease, and would say they felt well when the thermometer showed a temperature of 104°. The circulatory system was not much affected. The pulse and the temperature were never consonant. The pulse seldom indicated more than 100 to 106, even though the temperature was 104° to 104.5°. The respiratory system was affected in only one case, a bronchial catarrh existing at the outset of the disease.

The axillary temperature ranged from 100° to 105°. But one case reached a higher temperature, marking at one time 105.6°. Most of the cases showed at some time for an evening temperature 103° to 104°. In nearly every case the fever would remit at the end of the tenth or twelfth day and stay normal for two days, and then start afresh. There would be two or three distinct remissions in the course of the disease. The temperature would often show a typhoidal curve, 101° to 102° in the morning, 103° to 104° in the evening, and would continue in this way for two or three weeks; then it would become very irregular, sometimes higher in the morning than in the evening. The fever would finally develop into a low form, 100° in the morning and 101° in the evening, and continue in some of the cases for two or three months.

Most of the cases were troubled with profuse night sweats, which rendered them very weak. The urinary system was marked by enuresis in most of the cases; the urine was free from albumen. The locomotor system was affected in all the cases. Toward the subsidence of the fever the patients would suffer intense pains in the muscles and would often have rheumatism of the joints. The cases were all marked by a tedious convalescence, and it would be three or four months before the muscular tone was fully restored.

While the ship was at Villefranche I met Surgeon Major de La Case, of the French army. He informed me that he had been stationed with a regiment the year previously at a garrison not far from Nice, and an epidemic broke out which was termed cerebro-spinal grippe, the disease affecting the nerve centers. The mortality was about 40 per cent, but the post-mortem did not reveal any serious lesion of the brain or cord; in fact nothing could be found to account for the great mortality.

The *Marblehead* has cruised about 15,300 miles during the year—has been seventy-one days actually at sea. The ports visited have been Gibraltar (touching first at the Azores), Beirut (Syria), Alexandretta, Mersina, Smyrna, Piræus, Naples, Algiers, Gibraltar, Southampton, Hamburg, Kiel, Cronstadt, St. Petersburg, Copenhagen, Stockholm, Christiania, Gravesend, Gibraltar, Algiers, Spezzia, Marseilles, Villefranche, Naples, and return to Mersina.

The stay at most of the places averaged about one week in duration. At Spezzia, Italy, the ship was docked and a stay of sixteen days was made. Liberty was given the crew, and about 50 per cent of them contracted venereal disease, four of them contracting syphilis. Being a large garrison town and the principal rendezvous for the Italian navy, one would think that a rigid inspection of prostitutes would be held, but judging from the results, as affecting our crew, hygienic laws in that direction must be very lax. At Beirut, Syria, I was much impressed with the thorough course of medical instruction that is given. The college is well equipped in all modern appliances—a fine chemical laboratory, a physical laboratory, and a histological and bacteriological department furnished with all the latest culture apparatus, and a Becker support microtome capable of cutting sections one five-hundredth of a millimeter thick.

The course is full four years, of nine months each, and with a trained corps of professors, such as the college possesses, a graduate from this school starts out as well equipped as from any medical school. The first class was graduated in 1871. There have been 145 medical graduates altogether since the school was opened. After graduating they are obliged to go to Constantinople and stand an examination before a national board of physicians before they are allowed to practice medicine; in fact, no foreign physician is allowed to practice medicine in

Turkey before he passes the Imperial board. Under the direction of the medical faculty of the college is the Knights of Malta hospital. It is under the immediate care of the German sisters of Protestant missions. It contains 75 beds and it is kept scrupulously clean. Rooms for private patients can be had at $1.50 a day; rooms with 2 beds at $1 a day. The outdoor clinics, held daily, are numerously attended, over 14,000 patients being treated during the year. Five hundred patients were treated in the hospital. From such a wealth of material it can be seen how great are the clinical advantages of the medical students. Hospitals in other places were visited, but not inspected sufficiently closely for a report.

REPORT ON THE U. S. S. DETROIT.

By Howard E. Ames, *Surgeon, United States Navy.*

In submitting the annual sanitary report of this vessel, I will say that it is compiled entirely from daily observations and notes covering a period of fifteen months. On first joining the ship I found that the dispensary had been moved from its original site in the after of the three berth deck compartments to its present place in the after berth deck. This change has been most satisfactory, as the heat forward was so great that many of the medical preparations were ruined, and the holding of the daily sick call was most trying to patient and medical officer. The dispensary is now all that could be desired on a vessel of this class.

Through some misunderstanding, the storeroom assigned to the medical department was changed and another smaller one, totally unsuited, substituted. It was impossible to stow the medical supplies in a safe and accessible manner. This was tried, but the confusion and crowding caused such destruction to stores and medicines that a change was imperative. Happily this difficulty was overcome by returning to the medical department the storeroom originally designed for its use. The medical supplies are now accessible and safely stowed.

The first inquiry made concerns the personnel of the ship. The complement of the ship is 243, including 16 officers, 16 marines, and 211 men and apprentices. This is varied, the monthly average of those actually on board being 238. The crew was fully up to the requirements, but few defects being noted. The main defect was in the teeth, not only among the men but with the apprentices as well. These were removed or improved by the employment of a dentist at a moderate rate, who saved many teeth by filling the cavities. The marked softness of many of the teeth was so striking as to attract attention. The dentist suggested that it was perhaps due to the deficiency of lime in the condensed water, so generally used in our ships. This leads to the question, would not lime added to our water prove beneficial? The more general use of the toothbrush in our Navy would prove to be of benefit. I have induced many of our men to purchase them, and on this ship it is often found a part of the toilet kit.

The cleanliness that is found in every part of the ship is extremely gratifying and is standing proof of her efficiency. This condition is not due to easy duty or agreeable places, for the ship has had a service that has been trying on everyone from the monotony and long stay in ports that were isolated and uninteresting.

The crew was from necessity quarantined, owing to smallpox and cholera prevailing on shore for various periods, the longest being nearly three months. During the cholera season at Foochow the inside of the ship was washed entirely with condensed water. The clothes of everyone were washed on board ship with the ship's water, a very wise precaution; the river water was only used to wash the outside of the vessel.

It is worthy of note that after this long quarantine when the men were given liberty in Hongkong their behavior on shore was most commendable. It was so marked as to draw favorable comments from the residents, not only upon their behavior, but also upon their neat appearance. The number of misdemeanors or delinquents was very small.

The next feature in the ship is the accommodations for the crew. These are satisfactory in dryness and cleanliness and mess fittings, but the hammock-swinging space is not sufficient to give each a billet, and those that can swing are terribly overcrowded. The cubic air space per man compares favorably with some of our ships, but this is not always a fair estimate, for it does not represent all existing conditions. When the men have turned in, the irregular spaces and useless corners which go to swell the cubic air space are of little value when hygienically considered. The available billets are so narrow that the hammocks are in close contact. This is so serious that many are compelled to spread their bedding upon the deck to secure the sleep and rest so essential to everyone. There are sleeping billets provided in some parts of the ship, such as the alleyways and galley, which cannot be used owing to the excessive heat. Some of the billets are so placed that the men are exposed to drafts, or the wind blows directly upon them through the air ports or hatches. This forces them to the deck or compels them to seek other places. In warm weather in port, or smooth weather at sea, this congested state below is relieved, as then many swing their hammocks on the spar deck beneath the skid beams, which are provided with hammock hooks. This makes an admirable sleeping place. An attempt was made to make this a permanent berthing place by spreading a weather cloth from a wire jackstay stretched along the top of the rail to a jackstay running just beneath the fore and aft bridge. If the sea is at all rough immense amounts of spray are thrown by the projecting gun sponsons, which is thrown between the jackstay and weather cloth with such force and in such quantities that the men are driven below. This same spray keeps the spar deck constantly wet from the forecastle to the poop, even during moderate weather. In port and when cruising in smooth weather it is a valuable addition to the comfort of the crew.

The wet condition of the spar deck and the flying spray from a head sea prevents the usual amount of exercise that is always beneficial, such as walking, skylarking, and other innocent recrèations. Under such conditions I have seldom seen reading indulged in, and the crowding so contaminates the air that it is noticeable the moment one passes under the forecastle.

The sleeping spaces for the crew consist of the forecastle, three berth-deck compartments in the forward part of the ship, and one aft. No objection can be found to any of them in port except the after forward one. That is very trying to the men sleeping there from the heat due to the escape of hot air from the dynamo room, and also from the wing passages leading into this compartment. This is more marked when at sea. The doors to both the dynamo room and the wing passages are kept closed as a rule, but when necessity compels them to be opened the amount of hot air that rushes in is too great for comfort or health. The temperature varies from 95° to 105° in hot weather. The forward compartment is wet from the leaks in the ventilators and hawse pipes when the seas are ahead or rough.

The accompanying table gives the cubic air space in the several berthing compartments, and though fair when compared with the older ships, is not so good, as in them the air space was of a more available kind—for the large space gave a better chance for the air to circulate. In the modern ship the same space is cut up into compartments with fewer and much smaller hatches and the natural ventilation is poor. To offset this, however, we have the electric lights over the old candle and lamp, and artificial ventilation by exhaust blowers.

Air space per man.

	Cubic feet.
Forecastle compartments	98½
First compartment, berth deck	97
Second compartment, berth deck	73
Third compartment, berth deck	95½
Fourth compartment, derth deck	85½

This lack of berthing space can be remedied by converting the compartment now occupied by six wardroom officers, together with the country, into a sleeping compartment for the men. This has been done, I understand, on the *Marblehead* with the best results both for officers and men. It is unnecessary to dwell upon it further, as the Department is aware of the advantages of the *Marblehead* over this ship in this respect.

The heating of the ship is by steam and is all that can be desired. It is comfortable in the men's quarters, and the heat is evenly distributed. The officers' mess room, situated on the port side of the spar deck aft, is subject to irregular drafts. This is due to the ventilation being practically on one side. The air, having no outlet at the top, rushes in at the forward end and out through the air ports. This may be remedied by having the ventilators which fit into the poop-deck deadlights made water tight, a defect that has prevented their use heretofore. This will be tried this winter and its effect noted.

The lighting of the ship is by electricity, and it can call forth none but words of praise. I can only say that the system appears to be hygienically all that one can desire.

The location of the dynamo room is bad for constant work. It is below the berth deck in a separate compartment. The natural ventilation is through the door which opens into the berth deck and a small ventilator which admits air from the forecastle. The artificial means is by an electric exhaust fan. These means are not sufficient to ventilate the place properly. The temperature is too high, fluctuating between 110° and 120°, depending on the outside temperature. Those on duty stand watch in undershirt and drawers. If the present location is to be retained, I can see but one remedy for this high temperature—cut through the after bulkhead into the fireroom and have the fan reversed, so as to force air in rather than out. It is a question of reducing the temperature rather than of fresh air. A change of location is the best remedy; the present plant could be retained for use in time of war or emergency. The retention in its present place seems to me an expensive policy when the health of the men is considered, for the present injurious results would continue during the whole life of the ship.

The natural ventilation of the ship is good when in port, with hatches and ports open and ventilators trimmed. The artificial ventilation comprises two systems—the rotating exhaust fans and the hot-air exhaust into pockets around the smokestack. The former applies to that part of the ship outside of the engine and boiler compartments and the latter to the coal bunkers entirely, which the outside air reaches through ducts beneath the hammock netting on the spar deck. The only complaint against the exhaust-fan system is its lack of capacity. This is no doubt due to the crooked course of the air ducts and the small size of the blowers. This lack of capacity, I understand, can not be overcome with our present fans, as they can not be run at a greater speed (450 revolutions per minute) without endangering the integrity of the apparatus. The forward fan does better work, due, I think, to the more direct lead of the air ducts. The most distant blower of the after system does hardly any work; it can barely produce motion in the flame of a candle. It is to be hoped that this defect in the amount of air will be remedied when the ship is overhauled for the next commission. With these drawbacks the present ventilation is far above the condition that existed in our old ships, and it is only felt seriously on our long sea trips, which fortunately now are the exception rather than the rule.

The water-closets for the men are adequate in size and contain a sufficient number of seats. They are well located, situated on the port side under the forecastle. There are two grave defects one in construction and one in design. The trough or receptacle is semicircular in transverse section; this allows the fecal matter to strike and adhere to the trough above the line of running water. It adheres so firmly that it can only be removed by the application of a brush or swab. Were the back straight or placed at an angle downward and backward from the perpendicular it would prevent this soiling and insure a quick removal of all excrementitious matter, as it would all be water borne. The construction of the trough is markedly defective. Instead of it being cast with perfectly smooth sides and bottom and porcelain lined, it is crudely made of rough boiler iron, the sides and bottom are rough, the rivet heads protrude and hold fecal matter so tenaciously as to require the scrubbing brush to keep them clean. The circulating pumps keep a constant flow of water through the trough, sufficient to keep it clean if properly constructed. At sea the water-closet odor is constantly present. This is not due to lack of cleanliness, but to the defects I have mentioned and to insufficient ventilation. This last can be overcome by putting in tight doors and extending the forward ventilator about 2 feet, that it may project well into the closet and making it perflating with the after one trimmed from the wind as an exhaust. These changes, I think, would make the men's water-closets satisfactory. I might add that a tile floor would be an advantage over the present cement.

The officers' closets are placed on the berth deck in the after compartment, immediately abaft the wardroom and junior officers' quarters. They are three in number, and extremely faulty both in construction and design. The bowls are pyramidal in shape, and of an obsolete pattern that has been condemned and discarded by sanitarians years ago in all well-regulated municipalities. The bowls should be straight at the back to prevent soiling. A hand pump supplied the water to wash out the bowls and also to empty the contents at alternate strokes, only two gills of water being supplied at a stroke. The difficulties under that arrangement led to a connection being made directly with the circulating pumps. Now an abundance of water can be obtained by turning a valve, and if care is taken to fill the bowl one-third full before using, it will prevent soiling, as the fecal matter is then water borne. The whole system should be replaced by a more modern outfit.

I can see no valid reason for placing these closets on this deck. The compartment which they occupy is dead-air space at sea when the ports are closed. The blower is so weak in its action that it does not remove the odor, and, it being next to the junior officers' stateroom and their quarters, it is both obnoxious and unhealthy. It should be removed to the deck above, as has been done on the *Marblehead*. The bowls would thus be emptied by gravity, and they would always be free from offensive odors as there would be proper ventilation.

The washing facilities for the men consist of two rooms, one under the forecastle for the deck hands and the other for the engineer's force on the berth deck over the forward fire room. The one for the deck hands has never been used as a wash room; it is now used as a storeroom for deck gear. Its removal would give increased air and breathing space to the crew under the forecastle. The wash room for the firemen and coal passers is badly fitted. Nine washbowls (12 by 15 by 18 inches), well built, are firmly fixed against the bulkhead. This, with a single fresh-water shower, comprises the washing outfit. The basins or bowls are poorly shaped—too deep—and so closely packed together that they can not all be used at the same time. The floor is cemented with a very dark cement, which does not last well. In hot weather it scales off. It should be replaced by a light tiling or brick laid in cement. This room is very dark and ill ventilated, and at sea under steam it is very oppressive. The question of reducing the high temperature was a very troublesome one, and, though not overcome, has been improved by removing the louver and manhole plates. This allows a steady current of exhaust air from the forward berth deck to be discharged into the wash room. By this means the temperature was reduced from 120° to 99° F. The air thus supplied was not pure, but the difficulty to be overcome was not foul air, but high temperature. The fittings of this wash room should be entirely changed. The washbowls should be removed and two lines of perforated pipe, one running overhead and the other on the side about the height of the hips, substituted. When these pipes are flushed with salt water from the condensers the water jets will fall directly upon the bodies of the men and then to the floor into the drain tanks already provided, and pumped overboard. Two basins in rings for simple hand washing and two small fresh-water showers to wash off the salt water should be added. These changes would secure a more expeditious and thorough washing of the men with less water, and a clean floor secured. These changes should be made at once, as they can be easily and cheaply done in a very short time.

On either side of the ship, inboard from the bunkers, run the fore and aft passageways. These have iron floors directly over the boilers. The superficial area of each is 246 square feet. When the ship is under steam the temperature of the floor plates is 135°, and this great radiating surface raises the temperature of the alleys to 125°. The only escape for the hot air is through the end doors and seven deck ventilators. The forward door is generally kept closed, as the escape of this hot air into that compartment constantly would render it uninhabitable. A number of experiments were made under all the conditions that the surroundings would allow, and under the most favorable conditions the best results gave a temperature of 110°. The average of the experiments gave a temperature of 117.3°. The best results were obtained by the use of wind sails and under conditions that could not be permanently continued with the ship as she now is. The engineer's force, after washing, are obliged to step out into this passage and dress themselves, standing on plates of a temperature of 125°, with the surrounding air 117°. This is almost unbearable.

I would suggest that after washing, the men be allowed to dress themselves in the after forward berth deck in clean, dry clothes. The clothes of the engineer's force are always soaked with perspiration at the end of their watch, at which time they are supposed to wash and dry themselves. The difficulty of doing this in the present wash room and then removing to the forecastle to dry takes so much time and labor under such trying conditions that it is often neglected or half done. The drying on the forecastle in clear weather is excellent, but in wet weather or when spray is flying it is a serious matter, and the consequence is that damp clothes are generally put on at the beginning of a watch, which is always a dangerous practice. This applies to the whole ship's company, but more particularly to the engineer's force. The difficulty can be completely overcome by using the starboard passageway as a drying room. With the deck ventilators of the passage open and the doors closed the constant heat in the passage would quickly dry all the wash clothes of the ship's company. I strongly urge that this practical and beneficial use be made of it. Instead of remaining in its present idleness it should contribute to the comfort of the crew and preserve its cleanliness at the same time.

While on the subject of clothes, I would mention that the discarding of the white canvas hat and the returning to the white cap cover over the blue is a decidedly poor change, as the white is much cooler for summer—in hot climates a great health consideration.

It is here I will make a few remarks upon the engineer's force, based upon observations made upon this vessel, and which, I think, apply to the whole service. The modern warship is a series of small compartments, demanded for strength and security. This compartment system is followed in the coal bunkers. When under steam in hot weather, these bunkers are not properly ventilated, and in addition to this the heat is too great. The deficiency of fresh air is not so serious a defect as the high temperature which surrounds the men while working. During the summer we were up the Yang-tse River, and during that trip the temperature of the coal bunkers ranged from 115° to 127°, while the outside temperature on deck was from 95° to 100°. If the engineer's force is expected to maintain its efficiency, it is important that some scheme be devised to overcome this excessive temperature. It is absurd to expect nature to overcome a temperature of 28° under such conditions, and no human being can work efficiently in such a temperature without permanent injury to his physical and vital constitution. Take in addition to the heat the motionless, impure air of the bunkers, filled with coal dust, constantly clogging the sweat glands of the men, and a moment's thought will picture their deplorable condition. During the trip it was only by giving to each fireman and coal passer 2 ounces of whisky at the end of his four hours' watch that we were able to keep them at work and accomplish the trip. We had several cases of heat prostration, none of which were fatal. The men at the end of the watch were almost collapsed, streaming with perspiration, accompanied with stertorous breathing, rapid pulse, and trembling limbs. The eight hours' rest was not sufficient to restore them sufficiently to consider them efficient men.

This exhaustion was not due to the work, but to the abnormal conditions surrounding the workers. This is shown by the weight of the coal handled on this trying trip. The general consumption during one day was 26 tons, the daily average for the trip being 18 tons. If we admit that this average was handled twice, it would give us but 36 tons handled in twenty-four hours by 30 coal passers, or 1.2 tons per day per man, and this work was not continued beyond four hours. Such light physical exertion under normal conditions would scarcely be appreciated in its effect on the physical organization of a healthy laboring man. In this case we are forced to consider the degraded air and the heat as the cause. We can practically eliminate the degraded air of the bunkers by considering the amount of work done under similar conditions but in a temperature below that of the body. We are forced to admit that it is principally due to excessive heat. With this experience before us I think a modification of the routine work of the engineer's force should be made. When the ship is under way, the engineer's force should be excused from all duties except those pertaining to the engineer's department, in order to give them the advantage of every possible moment of rest. I mean by this all quarters, drills, musters, gymnastic exercises, and such matters. Such things consume time that should be given to complete rest. A space should be allotted on one of the decks where the men, after shifting into dry clothes, should be allowed to lie down and remain undisturbed by the master-at-arms or berth deck cooks on the plea of clearing up for inspection or for appearance sake. I know from observation that these disturbances constantly occur and often effectually disturb men at a valuable moment of their rest. I am aware that these suggestions clash with the traditions of the service, but they are neither trivial nor pretentious, but are based upon close observation and careful study of existing conditions and a careful consideration of what is for the good of the service. When in port, those parts of the routine omitted at sea could be resumed. Fortunately our stay in port generally exceeds the days spent at sea.

I am convinced that a number of apprentice boys should be assigned to the engineer's force and trained in the work of firemen and coal passers. At present our firemen and coal passers are largely drawn from the merchant service, and the conditions are so different and more trying that it is difficult to secure men suited for that particular work. This suggestion has been made before, but I only wish to voice the same opinion, as a medical man.

The change in the location of the dispensary to the after compartment has been most satisfactory. It secures the supplies from the heat that pervaded the former location and insures quiet and coolness for the sick. There is no sick bay, but the sick are swung near the dispensary, where they are quiet and comfortable.

I have been trying on this ship a new way of applying the hospital badge to patients on the sick list. It has proven so satisfactory and has so many advantages over the old way that I respectfully call attention to it. Two rectangular pieces of canvas, with the Geneva cross in the center, with whipped edges, are united by two pieces of red tape about 11 inches long. Two other pieces of tape are fastened on the lower end of the canvas, with free ends. The head is passed between the two upper tapes, the collar and cravat passed over the tapes. This brings one badge in front below the cravat, the other behind below the shirt collar. The four loose ends are tied beneath the arms. The badge can be seen the whole length of the ship, and if the patient stands with side view only the red tape under his arms can be distinctly seen.

The health of the ship has been excellent. The number of sick-days has been larger than one would expect, but an examination will show that the number of cases of injuries and venereal diseases make up the greater part. These should be eliminated in considering the sanitary condition of the vessel. The diseases directly traceable to ship life are few. No patients were transferred to the hospital.

At Fuchow the presence of cholera kept the men on board. It was during this time that I studied the effects of confinement on the condition of the crew. I noticed the great benefits derived from amusements upon the spirits and temperament of the ship's company. It was also then I noticed the happy effect of reading and appreciated the blessings of the library to the men. The question of amusing crews and keeping their minds in a healthy, happy state has been singularly neglected. I have noticed that the football and baseball players, the musicians, and others who can indulge in these pastimes are little inclined to indulge in drunkenness and debauchery. All innocent games—chess, checkers, football, baseball, boxing, and other athletics—should be encouraged, and a small outlay made to furnish the necessary appliances.

The method now applied at the Newport training station for the apprentices, so carefully worked out and made so feasible by Chaplain W. O. Holway, should be introduced in our cruising ships. The electric lantern and the lectures he has already written, with the accompanying slides, deserve a careful investigation, and I am sure that if such were made it would become a feature of our ships. The question is too important to be passed over lightly and deserves full investigation and discussion, too lengthy for this report. Any outlay would be amply repaid by the improved morals, greater contentment, and reduced sick list.

REPORT ON THE U. S. S. CINCINNATI.

By L. B. Baldwin, *Surgeon, United States Navy.*

During the year 1895 the U. S. S. *Cincinnati* has been attached to the North Atlantic Squadron. On August 10, 1895, I succeeded Surg. C. A. Siegfried, U. S. N., the senior medical officer, whose thorough sanitary report is published in the Report of the Surgeon-General of the United States Navy of last year. His report will be found to contain a description and criticism of this vessel from the point of view of a sanitarian, which it is unnecessary to repeat here.

The "summary of the cruise" during the year, with the time at sea and in port, is presented (A).

It will be noted that tropical weather and southern latitudes have furnished the climatic conditions. Leaving New York January 19 and returning May 12, the intervening four months were passed cruising in the West Indies and Central America. After three months of summer in New York and vicinity, the rest of the year was spent on patrol duty on the coast of Florida, with headquarters at Key West, Fla.

A.—*Summary of cruise, 1895.*

Ports visited.	Date of arrival.	Date of departure.	Days in port.	Days at sea.
New York, N. Y.		Jan. 19	19	1
Hampton Roads, Virginia	Jan. 20	Jan. 30	11	6
Charlotta, St. Thomas	Feb. 5	Feb. 9	4	
Fredrickstadt, Santa Cruz	Feb. 9	Feb. 11	2	1
St. Pierre, Martinique	Feb. 12	Feb. 14	2	1
Castries, St. Lucia	Feb. 14	Feb. 19	5	1
Bridgetown, Barbados	Feb. 20	Feb. 28	8	1
Port of Spain, Trinidad	Mar. 1	Mar. 13	12	1
La Guayra, Venezuela	Mar. 14	Mar. 18	4	2
San Domingo City	Mar. 20	Mar. 22	2	2
Kingston, Jamaica	Mar. 24	Apr. 8	15	1
Port Antonio, Jamaica	Apr. 8	Apr. 12	4	3
Colon, United States of Colombia	Apr. 14	Apr. 20	6	4
Key West, Fla	Apr. 24	May 8	14	4
New York, N. Y	May 12	June 17	37	1
New London, Conn	June 18	June 20	2	1
New York, N. Y	June 21	Aug. 5	36	3
Newport, R. I	Aug. 8	Aug. 12	4	5
Key West, Fla	Aug. 17	Sept. 28	43	1
Cedar Keys, Fla	Sept. 29	Sept. 30	2	1
Port Tampa, Fla	Oct. 1	Oct. 5	5	1
Key West, Fla	Oct. 6	(*a*)	87	

a Remaining December 31.

The year has not been eventful from a sanitary point of view. Of the first quarter Dr. Siegfried has recorded the following:

During the month of January, the ship being at New York undergoing repairs and temporarily in a condition of discomfort from the character of the work going on and the difficulty of keeping warm and away from drafts, many cases of catarrhus bronchialis and a few of pneumonia developed, with, however, no unusual or noteworthy features.

At the various ports of the West India Islands and at La Guayra, Venezuela, visited, no endemic or epidemic influences found entrance to the ship, and the health of the ship's company has been excellent. For cause no liberty to the crew was granted at the ports of Castries, St. Lucia, and Port of Spain, Trinidad. * * * The officers were not allowed to remain on shore after 9 p. m. at these two ports.

He notes that "important sanitary improvements have been begun since the last occurrence of yellow fever at Port of Spain."

B.—*Annual statistical report, 1895.*

Class.	Diseases.	From last year.	Admitted.	Discharged to duty.	Discharged to hospital.	Continued to next year.	Sick days.
I	Parasitic		1	1			1
II	General infectious		31	23	8		220
III	Constitutional disorders of nutrition		3	1	2		15
IV	Nervous system		17	14	3		169
V	Visual apparatus		2	2			6
VI	Auditory apparatus		5	4	1		23
VIII	Nutritive apparatus (digestive and respiratory apparatus)	1	53	43	11		196
IX	Motory apparatus		5	4		1	33
X	Cutaneous apparatus	1	29	29		1	175
XI	Venereal	1	34	29	4	2	688
XIII	Injuries		35	34	1		332
XV	Poisons		3	3			72
	Total	3	218	187	30	4	1,930

The preceding "annual statistical report" (B) shows that the total number of "admissions" for the year, including 3 cases remaining from

1894, was 221, of which 187 returned to duty, 30 were transferred to hospital, 3 treated at the United States Marine Hospital, Key West, Fla., for eighty-four days, and 4 remained on the sick-list December 31, 1895.

The average complement for the year was 302.5; the total sick-days, 1,930, giving a daily average of patients of 5.29.

The "statistical summary" (B) shows that the two classes, "injuries" and "venereal diseases," furnished 1,020 of the total (1,930) sick-days.

Of the 93 comprising the engineer's force there were 55 "admitted," giving 720 sick days, an average of 13.09 sick-days per admission. The balance of the complement furnished 164 "admissions" and 1,210 sick-days, an average of 7.36 sick-days per admission. Thus, while approximately comprising one-third the complement and furnishing one-third the admissions, they exceeded in proportion more than a third the number of sick days. The excessive temperature under which this force is obliged to labor, deprived of air and sunshine, as they unavoidably are, it is not surprising that they furnish a larger percentage of sick and are the first to show the debilitating effects of service. It declares to all recruiting authorities the importance of special care in selecting firemen and coal passers.

Those of light physique do not long endure on the new cruisers, and perhaps a minimum weight of 150 pounds and well-proportioned height of about 5½ feet should be specified by "circular" or general order.

VENTILATION.

Temperature observations have been made regularly at 6 a. m. and 2 and 9 p. m. in the "living spaces" during the year by the medical department, from which I have compiled the "monthly temperature record" (C). Also illustrating the subject at a time when complaints were general, I present extracts from this record for the five days' trip from Newport, R. I., to Key West, Fla. (D), and another (E) for the like period after arrival.

C.—*Monthly temperature record.*

Location of thermometer.	February.			March.			April.			May.			June.			July.			August.			September.			October.			November.			December.			Average for year
	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.	
Spar deck	97	68	78	94	67	81	98	74	80	95	42	63	86	55	73	92	62	74	100	64	81	92	76	85	93	71	80	81	65	77	80	56	70	76 5
Sick bay	80	70	74	83	75	79	82	76	77	83	51	70	85	62	71	84	65	73	87	65	80	86	77	84	85	75	80	84	67	79	77	61	70	76 1
Compartment A 122	82	73	80	83	76	80	86	76	81	87	51	68	85	63	73	84	65	74	88	67	81	88	82	85	87	76	81	85	69	80	79	64	71	77 6
Compartment A 123	85	74	80	85	77	81	86	78	82	88	57	72	87	65	74	85	67	75	94	70	82	88	82	86	88	77	82	86	69	81	79	64	72	78 8
Compartment A 124	100	79	84	100	87	93	101	89	94	100	67	86	101	69	83	93	69	81	100	79	91	101	90	94	98	85	91	99	81	91	92	76	87	88 6
Torpedo compartment	87	76	79	92	80	82	87	81	84	87	64	77	90	63	77	85	73	....	96	72	84	90	86	87	89	78	83	88	76	82	80	72	78	81 0
Dynamo room (annex)	92	76	84	92	84	87	94	84	88	98	76	86	95	73	84	89	72	79	97	78	87	95	86	91	90	85	88	90	79	88	86	74	84	86 0
Forward fire rooms	162	120	143	196	181	188	200	182	189	122	91	109	No fires.						156	102	130	160	130	150	152	124	134	125	120	124	....	....	....	145 8
Relative humidity of sick bay	89	73	75	89	74	81	90	75	82	88	79	83	88	75	81	89	68	79	85	78	83	90	84	87	90	79	84	85	79	84	84	71	81	81 8

D.—*Temperature observations made during passage from Newport, R. I., to Key West, Fla.*

Location of thermometers	Aug. 18, 1895.				Aug. 19, 1895.				Aug 20, 1895.				Sept. 3, 1895.				Sept. 4, 1895.				General average.
	6 a. m.	2 p. m.	9 p. m.	Average.	6 a. m.	2 p. m.	9 p. m.	Average.	6 a. m.	2 p. m.	9 p. m.	Average.	6 a. m.	2 p. m	9 p. m.	Average.	6 a. m.	2 p. m.	9 p. m.	Average.	
Spar deck	82	90	84	85.3	82	87	84	84 3	84	86	83	84.3	83	89	85	85.6	84	87	89	86.6	85.02
Sick bay	84	86	86	85.3	85	87	86	86.0	84	85	85	84.6	84	87	89	86.6	85	87	86	86.0	85.70
Compartment A 122	86	88	88	87.3	86	86	87	86.3	86	85	87	86.0	86	87	89	87.3	87	88	87	87 3	86 84
Compartment A 123	86	88	88	87 3	86	88	86	86.6	85	85	88	87.6	86	87	90	87.6	88	87	86	87 0	87 22
Compartment A 124	94	98	97	96.3	94	97	97	96.0	95	96	97	96.0	96	101	98	98.3	97	100	99	98.6	97 04
Torpedo compartment	91	90	90	90.3	90	88	88	88.6	88	87	88	87.6	87	90	91	89.3	90	89	89	89.3	87 80
Compartment D 114	89	90	90	89.2	89	88	86	87 6	87	86	86	86.3	85	89	90	88.3	88	88	87	87 6	87 80
Wardroom passage	89	89	87	88.3	87	88	85	86.6	88	85	86	86.3	84	88	89	87.0	93	94	92	93 0	84.20
Dynamo compartment (annex)	90	92	97	93.0	92	95	93	93.3	90	92	94	92.0	90	94	95	93.0	86	88	87	87 0	91.60
Dynamo compartment (proper)	116	118	120	118.0	116	119	118	117 6	116	114	116	115.3	120	118	119	119.0	117	116	119	117.3	117 40
Engine room	102	101	99	100.6	101	102	101	101 3	102	101	100	101.0	102	102	99	101.0	102	102	100	101.3	101.04
Fire rooms	127	129	125	127.0	128	130	130	129.3	130	129	130	129.6	130	136	138	134.6	136	140	138	138.0	131.70

E.—*Temperature observations made while at anchor off Key West, Fla.*

Location of thermometers.	Aug. 12, 1895.				Aug. 13, 1895.				Aug. 14, 1895.				Aug. 15, 1895.				Aug. 16, 1895.				General average.
	6 a. m.	2 p. m.	9 p. m.	Average.	6 a. m.	2 p. m.	9 p. m.	Average.	6 a. m.	2 p. m.	9 p. m.	Average.	6 a. m.	2 p. m.	9 p. m.	Average.	6 a. m.	2 p. m.	9 p. m.	Average.	
Spar deck	68	74	78	73.3	77	80	75	77.3	75	84	83	80.6	82	88	83	84.3	82	86	84	84.0	79 93
Sick bay	72	73	75	73.3	77	79	80	78.6	81	81	81	81.0	81	83	82	82.0	82	84	86	84.0	79.66
Compartment A 122	73	76	78	75.6	78	80	86	81.3	82	81	84	82.0	83	85	83	83.6	84	85	86	85.0	81 46
Compartment A 123	75	76	79	76.6	80	81	87	82.6	83	81	81	81.6	82	88	90	86.6	84	86	88	86 0	78.06
Compartment A 124	84	85	87	85.3	89	90	93	90.6	96	93	90	93.0	89	91	93	91.0	96	99	100	98.6	91 66
Torpedo compartment	75	77	80	77.3	83	85	85	84.3	83	86	85	84.6	87	88	86	87.0	86	96	92	91.3	89 93
Compartment D 114	74	75	80	76.3	83	85	85	84.3	82	86	84	84.0	87	88	75	83.3	85	88	89	87 3	83.06
Wardroom passage	73	75	77	75.0	79	82	82	81.0	81	83	83	82.3	84	85	84	84.3	84	88	87	86.3	81 50
Dynamo compartment (annex)	80	81	83	81 3	86	90	89	88.3	87	90	87	88.0	88	90	92	90.0	90	90	91	90 3	87 60
Dynamo compartment (proper)	108	108	114	110.0	116	119	116	117 0	118	113	116	115.6	114	116	116	115.3	116	118	121	118 3	115 26
Engine room	96	103	104	101.0	104	105	106	105.0	102	107	107	105.3	106	107	108	107.0	107	110	109	108.6	105.40
Fire rooms	144	148	130	140 6	140	128	133	133.6	130	130	138	132.6	140	135	143	139.3	140	142	146	143 6	137.80

The general ventilation afforded by two 60-inch Sturtevant blowers is of incalculable value. Yet the present ventilation is entirely insufficient and the appliances inefficient in many parts of the ship for the reason that the "fans" or "blowers" are overtaxed by at least one-half. There should be two blowers abaft the engine room, as well as the two now forward. The present ones have not done and clearly can not do the work, and should be replaced by four smaller and more efficient ones, preferably with electric motive power, thereby eliminating largely the bulk, noise, and dirt.

Some attempts have been made to improve the fire-room ventilation, but there has been scarcely a fair trial since the changes. As indicated by the following record of temperatures in fire rooms (F) for dates mentioned before and since said improvements, it will be observed under what terrible conditions the engineer's force is obliged to work in ordinary cruising. I leave the imagination to picture the situation under extraordinary conditions.

F.—*Temperatures with original arrangement of fire-room blowers and ventilating system.*

	Jan. 30 to Feb. 5, 1895.					Mar. 13 to Mar. 14, 1895.					Mar. 18 to Mar. 20, 1895.					Mar. 23 to Mar. 24, 1895.				
	Fire rooms.			Engine room.	Deck.	Fire rooms.			Engine room.	Deck.	Fire rooms.			Engine room.	Deck.	Fire rooms.			Engine room.	Deck.
	No. 1.	No. 2.	No. 3.			No. 1.	No. 2.	No. 3.			No. 1.	No. 2.	No. 3.			No. 1.	No. 2.	No. 3.		
Maximum	162	158	....	110	82	196	142	....	110	82	204	134	....	112	81	192	138	....	110	86
Minimum	120	90	....	80	44	181	120	....	98	77	175	118	....	102	76	170	130	....	100	78
Average	143	136	....	104	75	188	136	....	107	80	187	124	....	107	78	184	134	....	106	82

	Apr. 12 to Apr. 14, 1895.					Apr. 20 to Apr. 24, 1895.					May 8 to May 12, 1895.				
	Fire rooms.			Engine room.	Deck.	Fire rooms.			Engine room.	Deck.	Fire rooms.			Engine room.	Deck.
	No. 1.	No. 2.	No. 3.			No. 1.	No. 2.	No. 3.			No. 1.	No. 2.	No. 3.		
Maximum	200	150	.....	108	87	199	168	.....	110	85	122	177	150	108	104
Minimum	182	140	.....	105	78	185	130	.....	102	73	91	140	98	79	52
Average	189	143	.....	106	81	191	147	.....	104	81	109	154	128	101	74

Temperatures with present arrangement of blowers and ventilating system.

	Aug. 7 to Aug. 8, 1895.					Aug. 12 to Aug. 17, 1895.				
	Fire rooms.			Engine room.	Deck.	Fire rooms.			Engine room.	Deck.
	No. 1.	No. 2.	No. 3.			No. 1.	No. 2.	No. 3.		
Maximum	140	120	102	102	74	156	128	110	112	91
Minimum	102	110	94	97	71	128	105	93	93	72
Average	126	114	97	99	72	139	119	99	107	85

It should be observed that the forward fire room has a record of 204°. The highest of which I am aware since the change was 170°, in September, while going from Key West to Cedar Keys, under favorable conditions for comfort. I need hardly say that it can not yet be regarded as better than "very bad," as the average for the year, with "any fires," will be seen to have been 145.8°.

The fire-room ventilation is a fit subject of inquiry by a specially qualified board, as well as compartment A 124. A berth deck which, with an actual space of 5,093 cubic feet and assignment of forty-six men, allows an average of 110 cubic feet per man, but the temperature record (C) shows great heat and an average of 88.6° for the year. It is not possible for men to sleep in this temperature of contaminated air and secure the needed rest. This berth deck could be improved by cutting an additional air port on each side, substitution of wire lockers for the present clumsy wooden ones, and change of dirty, concealed blower engines already spoken of.

The full benefit of the present artificial ventilation can only be secured by a scientific determination of the amount required for each compartment, with a designated revolution of "fans," and the area of "louvers" or "valves" adjusted to said requirements, with a method of controlling the same. This control is most important, and must not be subordinate to the whim of "every one to suit himself," but under the charge of a capable officer with intelligence enough to be guided by observed atmospheric conditions.

MEDICAL DEPARTMENT.

I wish to testify to the efficiency and adaptability of medicines furnished in the form of "tablet triturates," and I consider them in every way suited for use on board ship. It is to be regretted that the medical department is not yet supplied with a much better working microscope.

No class of diseases are so puzzling to the naval surgeon as the various fevers of nontypical forms occurring on board ship, especially in tropical countries. I can testify that as a young medical officer on a small ship I have longed for this invaluable instrument, which would have taken the place of both age and experience and cleared the uncertainty which so increased the responsibility. I think a microscope should be a part of the equipment which every medical officer serving the Government should have within his reach for the proper performance of his duty, and supplied by the Government. The "stretcher bar," specified by General Order No. 452, to be supplied by Bureau of Construction and Repair has not been furnished this vessel.

LIGHTING.

Illumination by the electrical system has given great satisfaction, directly adding much to the cheerfulness and comfort and indirectly as a powerful agent of sanitation by abolishing many of the dark corners where dirt or filth might be concealed.

ICE MACHINE.

The ice machine has never given more than 20 per cent of the results claimed, yet it has been of great benefit in cooling the refrigerators and the water in the scuttle butt, the latter being on an average about 90° when from any cause the ice machine has not been running. Sixty degrees is the lowest temperature now obtained under most favorable conditions in the refrigerator room, which will not preserve meats, and the machine has heretofore failed entirely in tropical weather.

The location of the "cold-air boxes" is bad, but the cold-air pipes should beyond question be reinsulated at once. I have, however, been informed that the "dense-air" machines have been replaced in many of the Atlantic steamers by the "carbonic-acid" machines, which are said to cost less, occupy less space, and do the required work better.

The efficiency of the ice machine is the more important inasmuch as the "tank" or water-storing capacity is about one-half the minimum advisable.

The "tanks" are also inaccessible and formed by a "jumble of angles," which it is next to impossible to keep clean.

CLOTHING.

The clothing issued during the year has caused no complaints of which I am aware. Being thoroughly convinced of the advisability of the compulsory wearing of light-weight flannels in the tropics, I am sorry to note that the almost perfect and appropriate cut, long since designed and in store, have not been supplied to this vessel and to the U. S. S. *Montgomery*, to which I was attached during several months in the spring of 1895 while cruising on the coast of Central America, where so many conditions required their use.

Should these flannels ever be omitted during the daytime, there should never be any exception to the obligation of "a rub down and shift into dry flannels" after, not before, the moderate and beneficial "setting-up drill" at evening quarters.

For the general prevention of disease while cruising in the Tropics, where the men will and should sleep on the upper decks, there is no remedy so effectual as the flannel underwear, and, if required, with the addition of the "abdominal flannel band" there will be obtained the greatest comfort and security.

REPORT ON THE U. S. S. MONTEREY.

By Robert Whiting, *Surgeon, United States Navy.*

During the year 1895 the *Monterey's* qualities as a cruising vessel and as a dwelling place for her crew in all weathers and climates have been fairly well tested, for during that period she has had to pass from regions of snow and ice through the temperate and torrid zones to the temperate belt beyond and has then been made to retrace her steps. The ship remained in the sound through the month of January. She came on to Mare Island in the early days of February, and after spending two months there she proceeded southward along the coasts of Central and South America as far as Callao, Peru. Here a stop of nearly two months was made. Her return voyage was begun on the 9th of July, and on the 30th of August she had arrived at the Mare Island Navy-Yard, having covered a distance of more than 10,000 sea miles and having been actually at sea sixty-nine days.

In the first sanitary report forwarded to the Bureau the writer pointed out certain features in the construction of this vessel that were likely to militate against the health of those serving on board. The experience of the past twelve months has been confirmatory of that expectation. A summary of morbific movement for each quarter is immediately subjoined:

Number of sick days during first quarter	403
Number of sick days during second quarter	608
Number of sick days during third quarter	484
Number of sick days during fourth quarter	152
Total number of sick days for 1895	1, 647
Total number of admissions	161
Daily average of sick	4. 51
Average complement	178

The coldest weather was experienced in the first quarter. The second and third quarters were passed in the tropical and subequatorial climates. The last quarter was passed at the Mare Island Navy-Yard.

The complement was full during the first, second, and third quarters. It was materially reduced by discharge for expiration of enlistment and transfer to other vessels during the last quarter, thus accounting for the insignificant return of sick during that quarter. In spite of this falling off, however, a somewhat marked increase was noted in the number of admissions, sick days, and daily average of sick over the preceding year, 1894.

Coincident with the departure of the vessel for the South Pacific an epidemic of catarrhal fever developed on board, which somewhat largely figures in the return for 1895; but as a similar epidemic is included in the statistics for 1894, the increased morbific movement is not thereby accounted for. The voyage was undertaken at a time when the climatic conditions might have been expected to be least favorable, but the weather encountered was altogether propitious, and no stop was made longer than five days between San Francisco and Callao, either in going or in returning. Rains were of rare occurrence either in port or at sea, and the hatches were kept open almost uninterruptedly, so that it may be said with assurance that conditions were in all ways favorable to the maintenance of the highest sanitation possible under the circumstances. Yet the resistance of the stoutest individual on board was tried hardly by this somewhat remarkable experience. A temperature chart of the various compartments, showing the heat developed, is appended to this report. A number were taken at varying intervals, but the general result is fairly stated in the one appended.

A number of incidents conspired to make a barely tolerable condition much less tolerable. Some of these were obviously unavoidable. In order to make sure of completing the voyage from port to port, 195 tons of coal in bags were carried on the vessel's spar deck, shutting out light and interfering with ventilation through the ports and hatches and through the doors of the superstructure. It was considered necessary to carry on the usual daily drills directed by the squadron routine, and in many instances repetition of the same drill, in addition to morning and evening quarters, with the setting-up drills included. The weekly inspection of the 109 compartments of the double bottom with their numerous subdivisions were conducted by the officers and men assigned to perform this duty with unvarying regularity. How exhausting this work was may be evidenced by the following observations taken by the medical officer after the persons named had concluded these trying inspections:

Officer.	Temperature.	Pulse.
	°	
Lieut. E. F. L.	102	130
Lieut. H. G.	101	120
Ensign W. W. G.	100	110
Ensign W. L. W.	101	....

The inspections occupied an hour or more each time and at the end there were frequent cases of exhaustion, vomiting, and headache.

The continued strain of resisting the high degree of heat early began to tell upon the men of the engineer's force. The closed fire room of the *Monterey* has no outlet overhead, the doors opening on one side into the overheated engine room and on the other into the berth deck.

The forced-draft ventilation not being in use, it was discovered that the fire room was fed by hot air from the engines on one side and on the other by air that had been devitalized by use on the berth deck. The medical officer upon one of his inspections found the temperature as high as 147°. There were quite a number of cases of exhaustion and vomiting, most of which were treated without entry upon the sick list.

The drills at general quarters, which were more frequently performed than any others, required the use of steam in the pump rooms underneath the wardroom officers' quarters and under the berth deck. It will be observed by reference to the temperature charts that these pump rooms registered the highest degree of heat, 180°. It required hours to bring the atmosphere in the wardroom down to 90° after these drills were concluded. The dynamo room, contiguous to the forward turret and underneath which the forward pump room is located, the main compartment of the berth deck separated from it by a steel bulkhead, suffered in similar fashion.

The stops in port were limited to the time necessary to coal ship. Mazatlan, Acapulco, and Panama were visited and the sanitary condition found unusually good in each. No fever was reported in any of them, but it was deemed best to restrict liberty. Malarial fever was prevalent to a limited extent in Callao, but it was necessary to give general liberty here and we have to report a few cases in consequence. Whenever a stop of more than three days was made in the Tropics the increased heat and the work necessary to be done told upon officers and men. The following communications, relating to sanitation, were addressed to the commanding officer:

At Sea, *April 16, 1895.*

Sir: Within the past three days several firemen have presented themselves for treatment, suffering from exhaustion after their watch in the fire room. Last night several of them were prostrated. One man was severely affected with vomiting.

I discovered upon investigation that the total air supply for these workers comes from the berth deck, where it is 80° temperature, and from the engine room, which is reported to be 85° in its coolest corner. From both sources it has already been contaminated before reaching the firemen. I need hardly point out that under such conditions it will not be possible for the men to hold out in their work.

Very respectfully,

Robert Whiting,
Surgeon, United States Navy.

The Commanding Officer.

At Sea, *April 21, 1895.*

Sir: I have inspected the storerooms, holds, and living spaces of this vessel and have to submit the following observations:

The ship is clean and the health of the people is, with the exception of a few mild cases of grippe, very good.

The temperature of the fire room last night was 135°, of the engine room 100°, of the dynamo room 108°, and of the pump room at the last turning of the turrets 194°. The temperature of the dynamo room, berth deck, and wardroom at the times of these maneuvers is increased by many degrees and remains hours afterwards at that elevation. At the last two inspections of the double bottoms the officers making them have returned from them in a well-nigh exhausted condition, the strongest and weakest alike suffering greatly from the heated and mephitic vapors that are stagnant in these spaces.

I deem it my duty to point out to you that there is grave danger of collapse in persons performing duty in these high temperatures like that of the pump rooms, and in such atmosphere as is now present in the double-bottom spaces. Should syncope occur in these localities you will readily comprehend that in case of a weak heart I might probably not be able to reach the individual before the heart failure proved permanent.

In general terms, excessive heat, as you know, reduces strength, endurance, and resistance to disease, therefore in such a vessel as this cruising the Tropics extraordinary care will be required to preserve the equilibrium of health and consequently the efficiency of the ship's complement.

I earnestly hope that the commanding officer may find it in his discretion to suspend as many of these exercises as possible while the vessel is passing through the Tropics in this very hot weather.

Very respectfully submitted.

ROBERT WHITING,
Surgeon, United States Navy.

The COMMANDING OFFICER.

VENTILATION.

The occasion would seem to be favorable to call attention in as urgent a manner as possible to the defects in the ventilation system in the officers' quarters. In a former report it was pointed out that on the berth deck the system could work as a supply on one fan and an exhaust on the other, but that in the after compartments, where the officers live, much more remote from the center and communicating with the starboard fan only, the system works only one way at a time. The constructor made plans for remedying the defect, but the vessel was ordered suddenly on this cruise with this fault uncorrected. The chief engineer of the ship, who was invalided home, and three other wardroom officers whose health suffered great deterioration by reason of exposure on this voyage, owe a part at least of their ill health to the defects of this system.

CLOTHING.

Having personally observed upon this voyage the distress inflicted upon officers and men by the strict enforcement of the regulation regarding uniform, I wish to speak in a manner as emphatic as may be respectful in protest against it.

The uniform headgear for officers in hot weather consists of the ordinary cap with the addition of a white cover, a close-fitting covering for the head heavier, indeed, than that designed for winter cruising. It prevents evaporation and radiation, confines the heat generated by exercise, thus rendering the head hotter, and affords no shade at all to the back of the head and neck. A more undesirable and unsuitable garment it would be difficult to formulate. The native inhabitants of the tropics wear a light straw hat or a helmet. I am quite sure we could take a lesson from them with advantage as to our comfort and as a precaution against sunstroke, for I strongly suspect that a landing party fitted out with these caps would furnish a considerable percentage of insolation. The men of the *Monterey* wore in the harbor of Panama a heavy blue undershirt next to their skins, and in the evening they were required to shift the white working clothes and put another woolen shirt over that worn next their bodies, with the thermometer in the nineties. It was a pitiful sight to see some of them in the sick-bay with their bodies, from the ankles to the neck, in a state of prickling, tormenting erythema. How could this condition be treated so long as the exciting cause was persisted in? Would it not be wise to have some medical officer on the next uniform board who has seen service in hot climates, where one-half at least of our cruising is done?

ELECTRIC LIGHTING.

So many complaints of ophthalmopathy (so called for want of a better term; the symptoms being those of eye strain; the eyes pain and are sore from use, and the accommodation grows difficult, although there is ample sufficiency of light—too much in fact) have been heard in the *Monterey* that suspicion has arisen in the mind of the medical officer that electric lighting, which is indispensable day and night in such a ship, may be the offending cause. The literature of the subject is somewhat meager. Instances are noted, however, in which individuals have been exposed to a light of great intensity with very serious and painful results, attributed to vaso-motor disturbances; and the statement is made that the violet end of the electric spectrum is invested with a peculiarly irritating quality. Within the past twelve months two men working in the dynamo room of the Mare Island Navy-Yard accidentally became exposed to a light of 10,000 candlepower for a few minutes. The immediate effect was trifling. Before 10 o'clock the same night one of them noticed that his eyes were becoming red and painful, and within a few hours he was in great agony. The sight of both eyes was almost gone. The conjunctiva was intensely inflamed, the cornea bulged. A condition of panophthalmitis, with destruction of the eyes, seemed imminent. Atropia and cocaine were instilled at once with gradual relief to the urgent symptoms. After forty-eight hours the eyes had resumed their normal condition. The second man was similarly affected within about the same period, but not so severely. If the intense ray is productive of such symptoms immediately, may not the continued daily and nightly irritation of a ray of minor intensity be productive of chronic results? Objective symptoms are wanting in the cases noted in the ship, but obtunding of the visual sense is certainly present in some. Singularly enough an absence of some days from the ship seems to relieve the condition.

PHLEGMONS.

The somewhat large number of sick days occurring on board the *Monterey* from boils, abscess, and paronychia has prompted inquiry as to how far personal habits of cleanliness have operated in originating the infection. The wash basins are carefully scrubbed with Sapolio, but the towels of the men, for lack of some drying room, are allowed to rest in their lockers after use; and in the moisture and heat a nidus is provided for the generation of any number and kind of cocci. In large ships certainly there could be set apart a room for the firemen, particularly, to dry and air their towels, and that it would reduce the loss in sick-days from these causes I feel confident.

BURNS.

The bursting of a steam pipe in the fire room during our turning trials in April furnished us half a dozen cases of burns. In this connection I wish to state that the cotton-seed oil furnished by the storehouse at Mare Island failed in the purpose of making a proper emulsion with which it was desired to treat them. Sweet oil was obtainable in the ship, however, and it was used to the exclusion of the oil supplied by the Medical Department.

HOSPITAL CORPS.

The need of a better rating for baymen has been made evident to the writer in a practical way in the *Monterey.* Within three years there have been four appointments by the commanding officer for that duty. A landsman acceptable and competent for the work would be installed, but no sooner would he become expert in his duties than the greater pay of a coal heaver in the fire room would prove too tempting and he would secure a transfer. It would be manifestly unfair to punish a good man by keeping him in a lower rating because his services were valuable to the medical officer. The hospital corps needs to be placed upon a permanent basis, just the same as other departments of the ship where skilled labor is required.

APPENDIX.

The following temperatures were taken at sea on July 23 in the various compartments of the vessel:

	°F.		°F.
Compartment No. 42, double bottom	89	Construction storeroom	88
Blower-room alley	99	Forward compartment No. 173	91
Country passage leading to cabin	89	Dynamo room	116
Country passage, starboard side	89	Pump room, before pressure was put on	93
Steering flat	88	Pump room, after pressure was put on	180
Officers' room No. 5	88	Electric storeroom	92
Officers' room No. 4	90	After berth deck	90
Surgeon's storeroom	88	Sick bay	90
Paymaster's storeroom, aft	88	Dispensary	92
Officers' room No. 2	87	Compartment No. 17, double bottom	86
Officers' room No. 3	89	Compartment No. 18, double bottom	86
Officers' room No. 10	89	Compartment No. 24, double bottom	86
Officers' room No. 11	89	Fore hold	90
Junior officers' storeroom	89	Port wing passage forward	92
Junior officers' quarters	88	Compartment No 1, fore deck	85
Country passage from after turret	92	Starboard wing passage forward	91
Compartment No. 109	85	Compartment No. 23, double bottom	86
Paymaster's storeroom, port side aft	89	Compartment No. 84, double bottom	87
Compartment No. 96, double bottom	86	Compartment No. 83, double bottom	88
After hold	90	Wardroom mess room	90
Officers' room No. 7	88	Officers' room No. 9	88
Cabin storeroom	89	Compartment No. 106, double bottom	87
Port after wing passage	88	Compartment No. 107, double bottom	87
Starboard after wing passage	88	Compartment No. 41, double bottom	89
Officers' room No. 12	90	Prison	92
Gunner's room	90	Starboard forward magazine	86
Carpenter's room	91	Port forward magazine	87
Warrant officers' mess room	91	After magazine	90
Executive officer's room	88	Forward shell room	89
Officers' room No. 6	88	After shell room	90
Officers' room No. 8	89	Forward ammunition room	100
Bread room	87	After ammunition room	96
Paymaster's storeroom and navigation	85	Armory	93
Paint room	92	Forward ordnance storeroom	87
General storeroom	86	After ordnance storeroom	91
Forward berth deck	89	Galley	121
Sail room	88		

REPORT ON THE U. S. S. BENNINGTON.

By C. T. HIBBETT, *Surgeon, United States Navy.*

During the year 1895 the U. S. S. *Bennington* was at sea forty-six days. Her service in port was as follows:

	Days.
Mare Island Navy-Yard	60
Acapulco, Mexico	28
Honolulu, Hawaiian Islands	187
Lahaina, Hawaiian Islands	23
Hilo, Hawaiian Islands	20
Hanalei, Hawaiian Islands	1

Special reports were submitted of an epidemic of remittent fever in February and March and of Asiatic cholera at Honolulu in August and September.

Upon return of the ship to Mare Island from Acapulco in March, 33 cases of catarrhus epidemicus occurred, and 12 additional cases have developed during our stay at Honolulu.

The large percentage of sick returned from this ship during the year can not be attributed to local causes on board ship. In all compartments the ship has been free of accumulations from which germs of disease could emanate, the ventilation is good, and the crew has been well fed, well clothed, and systematically exercised.

Of the 163 admissions, 90 were attributed to climatic or epidemic influences, 23 were traumatisms, and 4 were due to local influences on board ship.

During the year the ship was 238 days within the Tropics and 60 days lying in close proximity to the marshes at Mare Island Navy-Yard. In the history of the *Bennington* for the past year 13 cases of malarial fever were traced to the above evil, as was reported in "Notes on fever, February and March, 1895." If the exigencies of the service would permit, it would be advisable to give ships in commission preference at navy-yards by placing them alongside stone sea walls and relegating the ships out of commission to the wood structures to receive the foul odors and human poisons that originate and multiply under such conditions.

I have no recommendations to make affecting the hygienic appointments of the ship except to suggest the advisability of permanently transferring the junior officers' quarters to the medical department for a sick bay. During the year the above use of this compartment has been kindly granted by the commanding officer. It has been a great comfort to the sick. I can not see that the spaces could be better utilized on board ships of this class.

MEDICAL NOTES.

The Queen's Hospital at Honolulu was reported upon by Fleet Surg. George W. Winslow in 1894, so I will only submit the following statement for the last quarter, ending December 31, 1895:

Number of patients in hospital	72
Number of admissions during the quarter	164
Number of patients discharged during the quarter	144
Number of patients treated during the quarter	371
Deaths during the quarter	19

The causes of death were: Abscess of liver, 1; beriberi, 1; bronchitis, 1; cerebral concussion, 1; dementia epileptica, 1; penetrating wound abdominal cavity, 1; pneumonia, 2; remittent fever, 1; tuberculosis, 6; typhoid fever, 3; valvular heart disease, 1.

The only other hospital in the city is Lunalillo Home for Aged Hawaiians. As well known, it was established by King Lunalillo, and is a pleasant and beautiful home for the aged and decrepit of both sexes.

At Hilo and other ports visited by the *Bennington* there are no hospitals, but in each coast city or town of any importance of these islands will be found an American or English physician, appointed by the Government.

Since the visitation of Asiatic cholera to Honolulu in August the city authorities, composed of the highest intelligence of the islands, seem fully alive to the importance of putting into operation the best sanitary regulations. In a previous report I expressed my opinion of the good work done by the board of health in breaking the epidemic of last summer, and I can now report that it is zealously guarding against future invasions.

At the leper settlement on the island of Molokai there are now about 1,000 patients, against about 1,200 in 1893. The present well-organized effort to apprehend and isolate the victims of this scourge of the Hawaiian Islands is slowly but surely having its good effect. On the largest of the group, Hawaii, the disease is almost practically unknown at this time.

REPORT ON THE U. S. S. AMPHITRITE.

By JAMES E. GARDNER, *Surgeon, United States Navy.*

In forwarding to the Bureau the annual report required by regulation I beg leave to state that I reported for duty as the relief of Surg. Frank Anderson, U. S. N., on the 9th of December, 1895, and that, owing to the limited time covered by my service as medical officer of the ship the notes forwarded as to her sanitary condition have not the fullness that I would wish.

After a period of construction covering many years the *Amphitrite* was finally placed in commission at the navy-yard, Norfolk, Va., on the 23d of April, 1895, since which time she has been constantly employed.

The ship is a double-turreted monitor 259 feet long, 59.9 feet beam, has a displacement of 3,990 tons, a draft of 14 feet, and engines giving an indicated horsepower of 1,600. Her hull is of iron, and is separated by 9 transverse water-tight bulkheads. She has double bottoms, and has twin screws. The armament consists of four 10-inch guns, mounted in pairs in her two turrets, and a secondary battery of 10 machine guns. Her complement consists of 173 persons, of whom 13 are commissioned officers, 4 are cadets, warrant officers, etc., and 156 are enlisted men.

On her main deck between the two turrets she has a steel superstructure which furnishes room for the quarters of a commanding officer, with an office for his clerk and a pantry. In this superstructure is the wardroom country, a large, light, and cheerful apartment, having twelve large, well furnished, well-lighted rooms, intended for the wardroom officers, opening into it. Forward of the wardroom country is the wardroom pantry in the center; on one side is the galley, and on the other side the water-closets for the officers, and, divided by a passageway, the head for the men. The galley is provided with a Bramhall-Deane range, which works well, and a steam cooker.

The water-closets for the officers are fitted with the Bishop apparatus, which works very well, and with porcelain urinals. The head for the men has two rows of seats, fitted with hinged hard-wood seats that can be scrubbed, over an iron channel through which an abundant supply of water is kept constantly running, and it is remarkably free from odor and easily kept clean.

The berth deck, divided up by nine transverse water-tight bulkheads and two longitudinal ones extending the length of the engine room, after giving space for turrets, engine and dynamo rooms, blowers, pumps, and pipes, quarters for the junior and warrant officers, offices for the paymaster and the ship's writers, and a sick bay and dispensary, furnishes the berthing space for the crew in two principal compartments forward and two aft.

In the first of the two compartments forward, with a cubic air space of 3,421 cubic feet, 17 men are berthed, each man having 201 cubic feet. In the second an air space of 10,336 cubic feet is occupied by 68 men, each man getting 152 cubic feet of air. In compartment 15 aft, with 3,432 cubic feet available, 28 men get, each man, 123 cubic feet, and in compartment 16 aft, with 4,600 cubic feet, 32 men have each 144 cubic feet available. The quarters for the junior officers, with only two occupants at present, are very adequate. The same can be said of the warrant officers' quarters.

The sick bay is exceptionally good. Situated on the starboard side near the base of the forward turret, it is in perhaps the coolest part of the berth deck. It has an air space of 1,042 cubic feet, and is provided with a bath tub and water-closet, which act well. A neat cover for the bath tub makes an emergency operating table. The dispensary, at the base of the forward turret, is small but well fitted. In fact, I am very much impressed with the excellent furnishings of the ship throughout.

The ventilation of the ship below the main deck is effected by an extensive system of cowls, delivering the air taken in when the ship is under way or when there is any wind into a system of pipes leading to the berth deck and the compartments below. This intake system is assisted by an exhaust system consisting of two Sturtevant blowers, with a capacity, when run at 350 revolutions, of removing 10,000 cubic feet of the foul air. The bilges are easily cleaned. I have not been sensible at any time of the obnoxious bilge odor of the old wooden ship.

So far the most serious trouble developed has been the one of the high temperatures generated on the modern iron or steel ship filled with engines and imperfect means of ventilation so far devised to relieve the evil. From the records of the Medical Journal the suffering from this cause while the ship was cruising during the months of July and August was great. Temperatures as high as 183° in the fire room are recorded, with 167° given as the minimum during the twenty-four hours of that day. In the engine room for the same day are recorded 155° as maximum and 148° as minimum; the berth deck, 102° maximum; a stateroom in wardroom, 98°. There were numerous cases of heat prostration, cases of myalgia, cramps, and sudden diarrheas. A board appointed by the commanding officer, after carefully collecting the data, reported, and as a result the Department ordered an expert board, which made its report, and the ship was ordered to the navy-yard at Norfolk, where the changes were made. Since then the conditions have greatly improved. No test as severe, though, as that of last summer's cruising has been made since the change, but it is believed that no such temperatures will again be reached.

REPORT ON THE U. S. S. BOSTON.

By M. H. CRAWFORD, *Surgeon, United States Navy.*

The U. S. S. *Boston* went into commission November 18, 1895, at the navy-yard at Mare Island, California, after having been thoroughly repaired.

MEASUREMENTS.

Length on water line, 270 feet 3 inches; beam, 42 feet; extreme draft, 19 feet 9 inches; displacement, 3,189 tons; horsepower (official trial trip), 4,030; speed, 12 knots; brig rigged.

ARMAMENT.

Main battery, two 8-inch B. L. R., six 6-inch B. L. R.; secondary battery, two 6-pounder R. F., two 3-pounder R. F., two 1-pounder R. F., two 47-millimeter H. R. C., two 37-millimeter H. R. C., two Gatling guns.

MEDICAL DEPARTMENT.

Personnel: 1 surgeon, 1 passed assistant surgeon, 1 apothecary, 2 baymen.

Sick bay.—The sick bay is located on the port side, after part of berth deck; has a cubic air capacity of 1,200 cubic feet. There is swinging capacity for six patients; natural ventilation by three air ports 8 by 12 inches; artificial ventilation by one louver connected with forward blower. There is a stationary wash basin supplied with fresh water from tank in sick bay; also a porcelain bath tub and water-closet in port side of sick bay.

Dispensary.—The dispensary is located forward of the sick bay, and communicates with the latter by an open door. The air capacity is 450 cubic feet. There is a comfortable bunk provided for the apothecary, with suitable lockers for instruments, and a small dispensing counter. The sick bay and dispensary are well provided with electric lights.

Medical storeroom.—The medical storeroom is located on port side, after part of orlop deck. It is of ample size for storage of medical outfit.

SANITARY CONDITION.

Complement.—Officers, 18; men, 259; aggregate, 277.

Quarters.	Number of occupants.	Total air space.	Average air space per occupant.
		Cubic feet.	*Cubic feet.*
Cabin and main deck	1	2, 209	2, 209
Wardroom:			
Stateroom	12	4, 544	387
Country	....	1, 850	....
Steerage:			
Starboard	3	2, 632	877
Country	....	....	....
Warrant officers' room	2	1, 744	872
Berth deck	90	6, 275	70
Gun deck	164	31, 030	188

Brig.—There is one cell located on the after part of forward berth deck, port side; air space, 130 cubic feet. It is ventilated by numerous spherical holes in cell door.

VENTILATION.

The exhaust system of ventilation is used on this vessel. It consists of two Sturtevant blowers connected by air ducts to louvers in every compartment and room in the ship. The capacity of each blower when making 400 revolutions per minute is estimated at 8,000 cubic feet per minute. Independent ventilation is provided for dynamo room by means of a ventilator from deck and four electric fans.

The short time that has elapsed since the ship was commissioned renders it impossible for me to decide whether the ventilating system will prove satisfactory. The natural ventilation is obtained through air ports, hatches, skylights, and ventilators from the deck.

LIGHTING.

The ship is lighted throughout by electricity, and the plant gives very satisfactory results.

WATER, FOOD, AND CLOTHING.

There are three condensers with a capacity of 100 gallons per hour, which is aerated by Baird's patent.

The water is of excellent quality. The food and clothing are those allowed by the Navy regulations, and are satisfactory in every respect. Lockers are used for the marines and firemen and bags for the rest of the crew.

STOREROOMS.

The storerooms are well located and of sufficient size. They are all ventilated by louvers connected by air ducts with blowers.

BILGES.

The bilges are accessible for cleaning and do not communicate with living parts of ship.

WATER-CLOSETS AND BATHROOMS.

The water-closets for the men are located on the berth deck, occupying all of the forward compartment. The faults of the "head" are due solely to its location. It is inaccessible, and when the ship is at sea can only be reached through the living quarters of the berth deck. It is very objectionable to have the odor from the closets permeating the decks where the men eat, sleep, and live. The only remedy, I think, that would correct this serious defect is the removal of the head to the upper deck.

The wardroom officers' water-closets and bathrooms are located aft of the wardroom and are satisfactory. The junior and warrant officers' water-closets are situated forward on the port side of gun deck.

QUARTERS.

Cabin.—The cabin is located on the after part, starboard side, of gun deck. Has an air capacity of 2,209 cubic feet. The cabin is well lighted and ventilation is excellent. Has a water-closet and bathroom located in the after part of the cabin.

Wardroom.—The wardroom is located on the after part of the berth deck. There are 6 staterooms on each side of the wardroom country. Each stateroom has a deadlight and 1 air port 6 by 12 inches in diameter; 1 louver connecting with the ventilating system, and 1 electric burner. The wardroom country is used for a mess hall. It has 2 skylights, 6 feet 10 inches by 3 feet, and 8 electric burners and 1 electric blower. The ventilation is excellent and it is well lighted.

Junior officers and warrant officers.—The junior officers occupy the starboard side, forward of the wardroom. There is transom room for 4 persons. Ventilated by 3 air ports, 6 by 12 inches, and 2 louvers. The warrant officers' quarters consist of 2 staterooms and a mess hall, and 1 additional stateroom, located forward of the wardroom on the port side.

Berth deck.—The berth deck is divided into the forward and the after berth deck. Has an air capacity of 6,275 cubic feet. The berth deck has billets for 90 men, with average air space per occupant of 70 cubic feet. Natural ventilation by 14 air ports, 6 by 12 inches, and 3 hatches, 7 by 6 feet. Louvers connect with general ventilating system. The berth deck is well supplied with electric burners.

The gun deck.—It is separated forward from the forecastle by a steel bulkhead, and aft from the cabin by a similar arrangement. Has a total air space of 31,030 cubic feet with billets for 164 men, average air space of 188 cubic feet per occupant. Natural ventilation is excellent. There are 4 gun ports and 5 air ports on the starboard side, and 4 gun ports and 7 air ports on the port side. Two doors open forward on the forecastle, and one aft. It contains the ice machine and galley. The gun deck is well lighted by electric burners.

The handling of wounded on shipboard.—In accordance with General Order No. 452, the method of transporting to sick quarters those disabled during action on shipboard was employed during great gun drills. I take great pleasure in attesting to the great efficiency in which this method was used on the *Boston.*

REPORT ON THE U. S. S. YORKTOWN.

By G. P. Lumsden, *Surgeon, United States Navy.*

The *Yorktown* was at Teng Chow, China, on the first day of the year and proceeded the next day to Chefoo, where the remainder of the winter was spent. Several trips were made to rescue missionaries fleeing from the Chinese in the interior and bring them to Chefoo, a treaty port. The ship presented an arctic appearance on returning from these trips, covered with ice and snow. One case of acute pneumonia, occurring in an apprentice boy while engaged in this duty, made a good recovery. Strychnia and brandy were used. Another case of pneumonia, complicated with pleurisy, in a tuberculous subject, was admitted near the end of March at Chemulpo. He was a Japanese servant weighing 98 pounds, and was transferred to the Japanese hospital soon after we arrived at Nagasaki and later invalided to Yokohama and discharged from the service.

There is a small hospital at Chefoo, in charge of French Sisters, and is patronized chiefly by the French ships. The rooms for men are small, and I do not regard it as a desirable place to send patients. There were two missionary hospitals filled with wounded and frostbitten Chinese. The ship went south in April, and after a short stop at Nagasaki proceeded to Shanghai for docking. The weather was mild here. Some cases of acute bronchial catarrh occurred, making a larger sick-list than we had during the severe winter in the north of China, probably due to the change of climate. After remaining at Shanghai thirteen days, about the first of May a short trip was made up the Yangtze Kiang to Chinkiang, when the ship returned to Chefoo for a short stay and then proceeded to Nagasaki via Chemulpo, arriving at Nagasaki May 21.

Cholera prevailed in Japan, China, and Korea last summer, the official record giving to the 5th of July 33 cases and about 16 deaths in Nagasaki, and more than 100 in that district, and it having increased at that time precautions in regard to food and liberty were adopted upon the recommendation of a board, of which Surg. C. U. Gravatt was senior member. The ship left on the 10th of July for Shanghai. The weather here was very hot toward the end of July. I was informed by the health officer, on our arrival at Shanghai July 12, that there had been no cholera in the settlement, but he expected it, and in a short time it was prevalent, and by the end of the month almost epidemic among the natives in the settlement, and 13 cases, with 6 deaths, among Europeans in the Shanghai general hospital, and 6 deaths among whites in the French Concession up to the 25th of July. The precautions in regard to food were continued at Shanghai, and upon the increase of cholera liberty was suspended.

A case of sporadic cholera, returned as cholera morbus, was admitted August 26, the day after the ship left Shanghai, in the person of the first sergeant of marines. He had serous diarrhea, with white flocculent precipitate, collapse in twelve hours, cramps in legs, suppression of urine, followed by fever, 100° to 102°, for several days. He recovered, his effects were disinfected, and no other cases occurred. Injections into the bowel of hot normal salt solution were used at the Shanghai hospital, with the usual death rate.

The month of September was spent at Chefoo, a summer resort, which is said to have the finest summer climate on the China coast. They had a good deal of cholera and dysentery there, some of the summer visitors dying, and men on several war ships. We had only one case of dysentery there, which recovered and was returned to duty.

October and November were spent at Chemulpo, Korea, where the health was said to be good. Beautiful weather prevailed.

There is no available hospital here. The Japanese army have their hospital established in a frame tea house, with two one-story thatched-roof wards in addition. The surgeon on duty did not speak English, but spoke German. There were few patients.

The ship arrived at Shanghai December 7. The sanitary condition of the ship has been good. There has been no epidemic on board. Only one death has occurred since I joined the ship. This was a case of hepatitis suppurativa and septic fever in a feeble Chinese servant who had the appearance of being much older than his record showed.

The entire crew has been vaccinated since arrival on this station, and some of the men revaccinated on board with bovine lymph from Tokyo; success attended in about 10 per cent of cases.

Forty-nine men were examined; 26 were found physically qualified, and 23 were rejected.

REPORT ON THE U. S. S. ESSEX.

By H. B. Fitts, *Passed Assistant Surgeon, United States Navy.*

I have the honor to submit the following report on the sanitary condition of this vessel and crew for the year 1895. On the 17th of January we left Newport, R. I., with 105 apprentice boys and 85 men on board, for a cruise in the West Indies. The following ports were visited: Barbados, Martinique, Santa Cruz, and St. Thomas. Returning to the United States, we stopped three weeks at Port Royal, S. C., for target practice, and three weeks at Yorktown, Va., for drill on shore. The ship then went to the navy-yard, New York (June 19), for repairs. During this cruise the decks had leaked very badly. They were now recalked, and since then have not leaked. Leaving Newport again, August 3, with a crew of 89 men and 108 apprentices, the following ports were visited: Plymouth, England; Lisbon, Madeira, and St. Thomas. Returning to the United States, we reached Yorktown, Va., January 1,

1896. The health of all the ports visited was good, and no case of sickness on board (except one of febris intermittens) can be attributed to the drinking water or climatic conditions of those places.

During the year the ship spent 186 days in port and 179 days at sea. The sanitary condition of the ship has been and is as good as could be expected, overcrowded as she is. By reason of small size, open deck, and insufficient berthing space this vessel is totally unfitted for the training service. The number of her crew is about 50 more than she can comfortably accommodate. The consequences are that it is almost impossible for the boys to keep themselves or their clothing clean; that in wet weather they are never dry, in cold weather never warm, and in the Tropics they suffer much with heat. Due to overcrowding on the berth deck, those affections which ordinarily would be very mild, such as small flesh wounds, sore throats, etc., frequently take on a more or less virulent form. An epidemic of pharyngitis or tonsillitis rarely stops until it has run through almost the entire ship's company. By good fortune we have so far been spared more serious contagious diseases. The sick bay can not well accommodate more than two patients at a time, but it is often necessary to crowd five or six in it. It has been my endeavor to have the berth deck kept as clear as possible of all obstruction to the free circulation of what little air finds its way there, but there is room for improvement in this respect. I would suggest that all the present locker and storeroom doors be replaced by others made of iron or wire grating.

In bad weather both at sea and in port it frequently becomes necessary to allow the boys to use the officers' water-closet forward under the forecastle. I would therefore suggest that another water-closet for the officers be built aft at the break of the poop similar to the one now in use on the *Alliance.*

As recommendations for other changes in the direction of adding to the health and comfort of the crew, and detracting nothing from the efficiency of the ship, will be made by the commanding officer, it is useless for me to speak of them here.

There has been but one death on board, viz, that of Charles O'Keefe, cockswain, by accidental drowning in the harbor of Santa Cruz.

REPORT ON THE U. S. S. CASTINE.

By G. B. WILSON, *Passed Assistant Surgeon, United States Navy.*

I have the honor to make the following sanitary report on the U. S. S. *Castine:*

During the past year this ship has made an extended cruise along the east coast of Africa and Madagascar, starting from the New York Navy-Yard February 3. It might be said that up to the time of our arrival at Cape Town, South Africa, July 2, the ship was nearly constantly under way, the time spent in port being absolutely necessary for coaling and making repairs to the machinery and boilers. The health of the officers and crew has been good, which, considering the unhealthy ports visited and exposure to the depressing tropical influences, is remarkable. The scrupulous cleanliness of the ship and general sanitary precautions adopted will account for the immunity from disease. Up to the arrival at this place, November 12, the distance steamed was about 20,000 miles, being at sea ninety-nine days and in port two hundred and sixty-six. The following ports were visited: Ponta Delgado, Azores, Gibraltar, Malta, Port Said, Ismalia, Suez, Aden, Zanzibar, Mozambique, Johanna Island, Island of Marquette, Tamatave, Lorenzo Marques, Cape Town, St. Helena, Pernambuco, Bahia, Rio Janeiro, St. Catherina, and Montevideo.

At the various places mentioned above, excepting the Island of Johanna, hospital accommodation was to be had, varying in comfort and facilities for the sick from fair to excellent. Malarial diseases were the prevailing affections found at the African ports, which at Tamatave, Madagascar, assumed the pernicious type, causing sad havoc among the French troops. Yellow fever and smallpox existed at Pernambuco and Rio Janeiro, Brazil. About four or five deaths were reported daily at both places from yellow fever, but this was not considered epidemic by the authorities. As mentioned in my report of last year, the living spaces for the men are rendered uncomfortable at sea in bad weather owing to leaky gun ports and hawse pipes. Berth deck compartment No. 3 has proved to be uninhabitable for sleeping purposes in the Tropics, owing to excessive heat (which is generated in the dynamo room, situated just beneath) and a lack of air supply. I would again recommend that ventilating tubes be inserted in this compartment. The officers' water-closets still remain without necessary ventilation, giving rise to a source of dangerous impairment to the health of the officers occupying the four after rooms. As mentioned, ventilating tubes could here be introduced with but little difficulty. While the general artificial ventilating system does good work, it fails to do all originally expected of it. It might be improved by increasing the size of the inlet ducts. The water supplied by distillation has been of good quality, free from salt, and of sufficient quantity for drinking, culinary, and other required purposes. In addition to the recommendations to improve ventilation in the living compartments, I would also recommend that the door to the brig be hinged so as to swing outward, which, by its overlapping edges, would prevent the inflow of water while scrubbing decks.

There were nine patients transferred to hospital, seven to the Naval Hospital, Brooklyn, N. Y., before the departure of the ship from the United States, one to the Somerset Hospital at Cape Town, returning to duty after a stay of nine days, and the ninth case, that of Lieut. Samuel Seabury, who was suddenly stricken with embolism (cerebral), was transferred November 26 to the British Hospital at this place, where he still remains, awaiting transfer to the United States.

Emergency medical boxes are being made for each boat, according to the squadron routine. The divisions are given weekly instructions in first aid to wounded.

REPORT ON THE U. S. S. RANGER.

By GEORGE T. SMITH, *Passed Assistant Surgeon, United States Navy.*

I have the honor to submit the following sanitary report on the U. S. S. *Ranger* from January 1, 1895, to December 24, 1895 when she was put out of commission:

The health of the crew has generally been excellent.

The following is a list of ports visited: San Diego, Cal.; Acapulco, Mexico; Panama, Colombia; Esmeraldas, Ecuador, and Guayaquil, Ecuador.

The ship lay at Buenaventura for nearly two months. It is a small town of 800 people, situated on Buenaventura River, 10 miles from its mouth. Extensive mangrove swamps line both banks of the river.

The rainfall here is 480 inches per annum, and the climate very hot. Malarial fevers abound.

We remained at Guayaquil for nearly four months. It is a city of 40,000 people, situated on the northwest bank of the Guayas River. It stretches along the water front for about 2 miles, and extends back for about 8 blocks. Only the first street parallel with the river—the Calle Malacon—is well paved. There is practically no drainage. The sewage is removed from the houses in barrels and carried across the river in large flatboats. The system is very imperfect and objectionable. The city is well supplied with excellent water, which is piped down from a small stream—the Agua Clara—in the Andes for a distance of 70 miles.

Yellow fever and malaria are endemic there, but the former disease is most prevalent during the rainy season, which extends from December to May.

The temperature during the rainy season averages about 90° F. and it is very hot and stifling. In the dry season the average temperature is 74° F., and every afternoon a cool, refreshing breeze comes in from the sea and lasts until nearly midnight.

It is very dangerous for men-of-war to remain at Guayaquil during the rainy season on account of the yellow fever. If necessity requires it, they should anchor on the opposite side of the river from the town.

There are two hospitals in Guayaquil—the military and civil. The former is situated on Santa Anna Hill, at the north end of the town. It is a large wooden building and has 250 beds, but has room for 500. It is in charge of a surgeon in chief and four assistants, and is attended by Sisters of Charity. It is poorly equipped.

The civil hospital is in the Calle San Alejo. It is a large square building and can accommodate from 200 to 400 patients. It is in charge of a chief physician and six assistants. Clinics are held here, and it is also attended by Sisters of Charity. When yellow fever is very prevalent an adjacent hospital is put up temporarily for the patients. There is a lunatic asylum near the military hospital which had 120 inmates. I regard the good health record of this vessel during her long sojourn in the Tropics to be due to the fact that she was kept in an excellent state of cleanliness both inside and out and that as strict a quarantine as possible was observed in the unhealthy ports of Buenaventura and Guayaquil. The decks were washed down with distilled water, and no river water was used for that purpose. The provisions were inspected daily. The head and water-closets were disinfected regularly, and, in short, the ship was kept in as good sanitary condition as possible.

The chief objection to the observance of these rules was that the necessary restriction of the crew on board ship became almost intolerable after a time. It is therefore my opinion that no vessel can be kept in the Tropics at one time for more than four months without endangering the health and efficiency of its personnel.

REPORT ON THE U. S. S. PINTA.

By S. G. EVANS, *Passed Assistant Surgeon, United States Navy.*

In compliance with article 682, United States Navy Regulations, I have the honor to submit the following report for the year ending December 31, 1895:

The health of the officers and men on board of this ship and stationed at the United States marine barracks on shore at Sitka, Alaska, has been good and no epidemics have occurred. The number of admissions to the sick list has been somewhat larger than in previous years, and the total number of sick days has been considerably larger, the latter circumstance being due to the more or less chronic character of many of the cases and the large number of cases of adenitis inguinalis and rheumatismus. No deaths have occurred on the ship or at the barracks, and only one patient invalided from the service, the cause being organic disease of the heart.

The greatest number of cases came under the head of injuries, and next under head of venereal diseases, although of the latter there were very few, considering the extreme prevalence of syphilis and other venereal diseases among the native women on shore. Probably many cases of venereal disease are never brought to the notice of the medical officers, and the custom of many of the men of marrying native women perhaps prevents the greater frequency of such cases. It is interesting to note the comparatively few cases of diseases of the respiratory organs, considering the climate of this vicinity.

The sanitary condition of the ship has been uniformly excellent, but unfortunately the same can not be said of the marine barracks and the sick quarters on shore.

The barracks is a frame structure, and during the winter months, when high winds prevail, it is uncomfortably cold.

The sick bay on shore is even worse than the barracks, and is really unfit for the reception of patients should any serious cases occur. It is the seaward end of a shaky old storehouse, and consists of three rooms impossible to keep at an even temperature.

I would earnestly recommend the construction of a suitable building for a hospital on this station should it be the intention of the Department to keep a ship and marines at this place.

The winter thus far has been comparatively mild, as was the latter part of the winter of 1894–95.

The U. S. S. *Pinta* was absent from Sitka, Alaska, thirty-five days during the year, and actually under way ten days.

The average complement, including marines on shore, was 90, and the daily average of patients 2.3, the percentage of sick being 2.67.

The total expenditures for the year amounted to $470.35, and only once was it necessary to purchase extra provisions in the shape of milk for the sick.

All rations on the ship are commuted, it having been clearly demonstrated that the men can be very much better fed by this means.

Twelve men have been examined for enlistment during the year and two rejected, but the disabilities were waived by the Bureau of Navigation, both cases being reenlistments. The hospital of the Presbyterian Mission on shore contains about 30 beds and has great conveniences for the care of the sick and for surgical work. The health of the port of Sitka is excellent as far as the white population is concerned, but tuberculosis and syphilis are rapidly exterminating the native element.

SPECIAL REPORTS.

FOURTEENTH ANNUAL REPORT OF THE UNITED STATES NAVAL MUSEUM OF HYGIENE.

By N. L. Bates, *Medical Director, United States Navy.*

The repairs and improvements made at this museum during the last fiscal year have been very great, and will be briefly noted.

The buildings have been painted on the outside, stone and brick piers have been removed from the basement, and new floors laid. On the first 2,500 square feet have been relaid with oak parquetry flooring and 1,200 feet with Georgia pine, all in waxed finish. Carpets, rugs, and matting have been supplied for reception room, offices, and corridors, and the furniture repaired and put in good condition.

Four abandoned cisterns, which were in bad condition, have been filled in. The heating plant, which was worn out and almost useless last winter, is being entirely changed. A new smokestack has been built, new boilers, steam pipes, and radiators have been contracted for, and the work of installation is now going on.

Much work has been done to improve the arrangement of museum exhibits. These are now in some confusion on account of the work connected with the steam heating, but when this is completed it will take but little time to properly arrange them for advantageous study. Comparatively few exhibits have been added during the past year. The most important new exhibits are sets of blue prints of the naval hospitals at New York, Philadelphia, and Norfolk, with detailed plans of buildings and grounds and exact location and details of all sewer, gas, and water pipes, electric wiring, etc. These have been prepared by the Bureau of Medicine and Surgery. The tracings are carefully preserved and the blue prints arranged for ready reference. Similar tracings and prints are to be made for all the naval hospitals. The value of such plans will be readily understood by everyone who has had any experience in hunting for connections or leaks in old buildings and grounds without plans for guidance.

In the last fiscal year the library building has been almost entirely rebuilt. It is circular in form, 40 feet in diameter, with side and lantern lighting, stamped steel ceiling, oak parquetry floor, and oak shelving, library tables, and furniture.

In the south wall is a handsome fireplace, and over the mantel the bronze tablet contributed by the medical officers of the Navy in memory of Surg. James Markham Ambler has been appropriately and permanently set.

The library itself has been inventoried, checked, and classified. It is now available for ready use. During the year many valuable additions in the way of State and municipal health and water reports, Government publications, and private contributions have been made. A few recent necessary works, relating principally to hygiene, have been purchased by the Bureau, which has also supplied current journals of medicine, hygiene, sanitary engineering, and building. One hundred and seventy-five volumes of pamphlets and journals have been bound.

The work done by officers of the museum has been important. Much of it is included in reports which have been made to the Bureau from time to time, and some of these have involved considerable research and labor. The hygienic care of ships in our modern Navy and the prevention of epidemic diseases have been subjects of a careful report. Examinations and reports have been made on materials and supplies, new inventions, etc. One hundred and ninety-two large photographs were made for the office of the Secretary of the Navy. In the chemical laboratory thirty examinations of water supply and one hundred and seventy examinations of urine, blood, milk, etc., were made for the service, in addition to the examinations required in the progress of the museum work. The necessary bacteriological cultures for these examinations have also been made.

An institution like this can never be finished. Growth and progress are essential to its usefulness. As a central national museum of sanitary science, it should be second to none in the world. The cooperation and aid of naval officers and all sanitarians are desired and invited. The more complete the collections are made the greater are the benefits to be conferred.

REPORT OF THE MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.

By N. L. BATES, *Medical Director, United States Navy.*

In accordance with your instructions contained in orders of September 23, 1895, I submit the following report of the proceedings of the meeting of the American Public Health Association held at Denver, Colo., during the first week of October, 1895.

Owing to various causes the meeting was relatively small in numbers, about 120 delegates and members being present, but in the character and standing of the members, value of papers presented, and their able discussion the meeting was noteworthy.

The first paper read, "On the Mississippi River as a sewer," while dealing with the general subject of pollution of rivers and water supplies, had special reference to the canal which is to connect Lake Michigan with the Illinois River and will convey the sewage of Chicago to the bed of the Mississippi. The author held that the General Government should prohibit the pollution of streams. The construction of the Chicago Canal was defended by Mr. Hering, of New York, in the discussion which followed, and Dr. Bryce, of Toronto, Canada, spoke earnestly against the use of Detroit and Niagara rivers as dumping grounds for garbage.

The next paper was a report of the committee on "Animal diseases and animal foods," by D. E. Salmon, D. V. M., of Washington, D. C., which was discussed by several members.

Four important papers on "The sanitation of railway coaches," and their discussion, finished the work of the first day. These papers described the methods pursued by the Pullman Car Company, discussed the ventilation of railway coaches, with the difficulties and requirements, and included reports from various railway companies on the subject of car sanitation.

In the discussion of these papers the use of formaline, one of the more recent germicides and disinfectants, was highly commended, and the results of important recent experiments as to its value communicated to the association.

On the second day, after the regular business meeting, a paper by Dr. Horlbeck, of Charleston, S. C., described a comparatively cheap but efficient steam disinfecting patent for hospital and municipal use. A plan and description of this plant have been promised for the use of the museum. This and a paper by Dr. Chapin, of Providence, R. I., gave rise to an interesting discussion on the subject of municipal disinfection for various diseases. Resolutions were adopted on the death of M. Pasteur and a cablegram directed to be sent to Dr. Roux, of Paris, as follows: "The American Public Health Association mourns the loss of Pasteur."

Another resolution was as follows:

> *Resolved,* That the American Public Health Association respectfully requests the Postmaster-General to so modify the order now in force that specimens of diseased tissues, when previously inclosed in approved mailing packages, may be admitted to the mails for transmission to State and municipal laboratories.

The microscopic diagnosis of diphtheria, ocular hygiene in schools, and the subject of vital statistics were considered.

The third day, after the usual business meeting, a paper was read advocating State laboratories, to be supported by Congress, with the form of a bill therefor.

Drs. Swarts and Chapin, of Providence, R. I., then gave the results of extremely valuable recent experiments on the "Mechanical filtration of water," which showed that such filtration was sufficient and capable of making water safe for all uses in city as well as household supply. The addition of alum in a regulated proportion of one-half grain to the gallon of water gave no chemical reaction after filtration and greatly increased the efficiency of the filters.

Papers upon "Medical inspection of schools" and "Disposal of the dead" were full and able.

In the evening Dr. Soley, of Colorado Springs, read a paper upon the peculiar sanitary results from residence at high altitudes, in which he argued that the special effects are to increase chest expansion, the amount of red corpuscles, hemoglobin, and the power of blood absorption.

In the report of the committee on the abuse of alcoholic drinks the use of black coffee and pure light wines was commended and increased tax on all liquors and Government charge of the manufacture of all forms of alcohol urged. Lack of time only prevented a warm discussion of this paper. "Degenerative heredity as affected by modern civilization," was the subject of a paper by Dr. Denison, of Denver.

On the fourth day officers were elected for the ensuing year. Dr. Eduardo Liceaga, of the City of Mexico, was elected president. Buffalo, N. Y., was selected as the place of the next meeting.

The papers of the day were mainly by delegates from Mexico, and with few exceptions were read by title only and referred for publication.

Dr. Carmona y Valle, of Mexico, advocated the hypodermic injection of urine from yellow-fever patients as a prophylactic measure against yellow fever. There was no discussion of this paper.

The meeting adjourned to meet at Colorado Springs, where a short session was held on Saturday and resolutions of thanks to all who had contributed to the entertainment of the association at Colorado Springs and Manitou were passed. Although the final adjournment did not take place until the 7th, no further business was transacted.

REPORT OF THE MEETING OF THE ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES.

By JOHN C. WISE, *Medical Inspector, United States Navy.*

In obedience to the Department's order of May 1, 1896, I reported at Philadelphia on May 12 last, as a representative of the Medical Department of the Navy, at the meeting of the Association of Military Surgeons of the United States.

The object of this reunion of the medical officers of the Army, Navy, and National Guard is to promote the advance of all that relates to military medicine and surgery. Judged from this standpoint, the last meeting was one of unusual interest. Thirty-seven papers, most of them of distinct value, were read and discussed. The scope of this report will permit of brief allusion to some of them of special interest to the naval service. Many papers were of general professional and scientific value, and will appear in the published transactions of the society.

The hospital corps.—This was the text of papers read the first day, eliciting a full and able discussion. The fact must be conceded that the advance in the means for the care of the wounded has not been at all commensurate with that of the instrumentalities of destruction. The papers and the discussions ably demonstrated that, owing to the changed conditions of modern warfare, our present facilities are entirely inadequate to the relief which should be expected; and if all aid in this regard be rendered, and the most zealous cooperation accorded, still the problem will be found most difficult of solution.

In so far as achieved results are concerned, as would be expected, our Army, with its hospital corps, gives the best showing, and is naturally the model of the National Guard. Most of the States have acted in the matter of securing an efficient hospital corps and all are aroused to the situation. In Massachusetts the work done has been excellent, and so successful has been the demonstration of the need of a hospital corps that in times of peace it has been the recipient of medals for its efficient service. It can be predicted that soon every State in the Union will have secured this great necessity in time of war. It is believed that this important matter will also be considered in our own service, and the desirability of having the wounded handled by trained aid receive full recognition. Not only is this emphasized by the enormous numbers liable to be wounded early in the action of the future, but our naval force is subject to mobilization at any time for operation in the field.

A paper read by Passed Assistant Surgeon Craig, U. S. N., presented points of interest in the way of preventive medicine. I append a summary, as follows, viz:

1. That the sterile cut surfaces of most of our fruits are inhibitory to the growth of the cholera spirillum; some of them destroying it rapidly, others taking a longer time.
2. That it is a dangerous practice to sprinkle or wash the cut surfaces of our fruits with water infected with cholera spirillum.
3. That fruits in themselves do not contain, or by spontaneous growth originate, the cholera-spirillum.
4. That some fruits, notably the watermelon and cantaloupe, offer a splendid culture soil for the cholera spirillum.
5. That in cholera-infected districts oranges and lemons are the safest fruits to use, acting almost as a prophylactic.
6. That a strongly acid lemonade would be the safest drink, in order to guard against the cholera spirillum.

7. Never use a fruit in a cholera-infected district unless you see it cut with a sterilized knife and know that the surface of the fruit is free from cholera spirillum.

8. That the very common practice, especially in tenement-house districts, of exposing for sale sections of fruits floating in water should be strictly prohibited during prevalence of cholera.

"Modern methods of anthropometric identification, so far as the United States soldier is concerned," was the title of a paper by Maj. Paul R. Brown, U. S. A., being an exposition of the methods of Bertillon, in use in the French service. This system is based on the deductions of Quetelet, and while known to those interested in this subject, has had no practical application in this country, so far as I am aware.

It may be called the system of identification by measurement, while those in vogue in the United States are based on identification by marks. There can be no doubt but that Bertillon's is the scientific method and will be eventually adapted to our wants. It seems assured that it can be simplified without affecting its value. It is urged against this system that, being in use to detect criminals, it would not be submitted to by a people of our disposition, and it was stated that its suggested use alone caused a riot in Boston. This difficulty, we believe, is not by any means a serious one.

The application of the Roentgen rays to surgical diagnosis was beautifully illustrated, at a clinic held for the benefit of the association, by Professor White, of the University of Pennsylvania. Thus far the surgery of the bones has received the most benefit from this discovery. Cases were exhibited showing clearly the union of the upper fragment of radius with lower of the ulna, and while deformity and immobility would have demonstrated an abnormality, the method showed exactly what the deviation from the normal was and how to remedy it. In a fracture of the forearm, osseous union of the two bones preventing pronation and supination was shown, and by this method a fracture of the coronoid process of the ulna, a very rare accident, was diagnosed.

It was interesting to note the deep shadow and outline of bone compared with the slight shadow of callus, varying with its age. A condition, metatarsalgia, described by Professor Morton was shown in its pathology to consist of disease of the matatarso-phalangeal joints, involving displacement, deformity, and nerve pressure. It seems probable that this important diagnostic method has not yet reached the limit of its usefulness.

At a clinic held at the Jefferson by Professor Senn, member of the association, fractured patella was operated upon. The lecturer impressed his audience with the necessity of exhausting conservative surgery before resorting to operation, stating that opening the knee-joint was the severest test of antiseptic surgery. Operation being determined upon, as in the case presented, an ample semilunar incision is made, the fragments exposed, the cartilaginous tissue between them removed, the edges renewed with the saw, and union effected with the drill and four wire sutures. Professor Senn preferred chromicised catgut, when union could be secured thereby. In cutaneous sutures, he preferred straight needles, horsehair, and his hand as a carrier. Attention was called to iodoform gauze, saturated in iodoform collodion, as a dressing.

Professor Senn exhibited a new bullet forceps, devised by himself, necessitated by the use of the new jacketed bullet. The old forceps could well be relegated to the gynecologist. The new instrument is unusually long, both in the handle and the blades, and the latter, when closed, have much the shape of the new missile. The blades are armed with coaptating teeth, and the missile, once seized, is never lost.

Captain Appel, surgeon, U. S. A., called attention to the advantage of asbestus as a surgical dressing.

I can not say too much in praise of the useful works of this association and the great desirability of the members of the Medical Corps uniting with it, as the best means of keeping in touch with those branches of the profession which most closely concern them.

A CASE OF GOUTY APPENDICITIS.

By M. H. Simons, *Surgeon, United States Navy.*

Mr. B., age 58, is stout, temperate in drinking and smoking, subject of late years to occasional attacks of gout, which have not as yet caused deformity of joints; shows also slightly increased area of heart dullness and an intermittence in beat of an average frequency of 1 in 30. Patient occupied himself during an afternoon in October in picking pears and working in the garden. In the former occupation he was obliged to stretch his arms frequently to their greatest extent above his head. Soon afterwards he noticed in the right side of his abdomen a slight pain, which increased during the evening, and at 10 o'clock became so severe that he called in a physician, who at 10.30 found Mr. B. in great distress, pain radiating from right inguinal region over whole abdomen. Percussion and palpation showed a small tumor in situation of appendix, and a diagnosis of appendicitis was given. Hot fomentations and an anodyne were ordered. At 9 a. m. next day the writer took charge of the case. The symptoms and treatment were as follows:

First day: Nine a. m., temperature, 103°; bowels constipated; pulse full and about 100°; intermittence not marked; surface clammy; mind dull; patient did not complain of pain unless he moved or pressure was made; tumor about midway between anterior superior spine of ilium and umbilicus, about 2 inches in diameter, projecting slightly above surface of abdomen; hot fomentations changed to hot linseed poultices. At 12 noon pain became sharp, and 0.016 gram morphia was given hypodermically. In the afternoon pain was severe; temperature, 103.5°; powders Seidlitz No. 3 were given, dissolved in hot water. At 8 p. m. powders Seidlitz No. 2. At 9 p. m. powders Seidlitz No. 2. About 10 p. m. bowels opened freely and pain and fever began to subside. During night and next morning bowels moved eight times.

Second day: Temperature, 100.5°; pulse full and strong, 100°; intermittence not marked; pain much less; tumor larger. Treatment during day, pil. morph. sulph. 0.01, p. r. n.; occasionally given a little warm milk. At 4 p. m., chilly sensations; temperature, 102°; powders Seidlitz No. 2; bowels opened freely, and at 7 p. m. patient was comfortable; temperature, 100°. In course of conversation this evening patient stated that during past summer he had had a severe attack of gout, which was preceded by pain in the right iliac region, but disappeared when, in a few hours, the great toe joint began to inflame. This statement aroused a suspicion that the appendicitis might be due to gout, and ℞ Ext. colchic., 0.06; lithii cit., 0.6; pulv. opii, 0.016, in capsule, every three hours, ordered, but not given, as the patient was so comfortable that night and next day.

Third day: Temperature, 100° to 101°; patient comfortable most of the time; occasionally mind wandered in the half-sleeping condition, and was dull at all times; hot fomentations continued; morph. sulph. pil. 0.01 t. i. d.; hot milk occasionally.

Fourth day: At 9 a. m., marked irritability and restlessness; frequent chilly sensations; temperature, 102.5°; powders Seidlitz No. 2. At 10 a. m., powders Seidlitz No. 1; bowels opened freely; temperature and restlessness less. Patient complained that left ankle and great toe were painful; on inspection they were found to be considerably swollen, red, and very painful to the touch. The foot was immediately immersed in warm water for fifteen minutes (hot water was added from time to time to keep the temperature as high as he could bear it); then the foot was enveloped in cotton batting, oiled muslin, and flannel. One of the above-mentioned capsules of colchicum, etc., was ordered every three hours. At 7 p. m., patient comfortable; foot not painful; swelling in abdomen same size, only painful on pressure and when patient moved. Capsules continued through night.

Fifth day: Nine a. m., patient better; foot less swollen, redness nearly gone, no pain; abdominal tumor same size, less painful; milk diet; continue capsules.

Sixth, seventh, and eighth days: Patient grew steadily better; pain in iliac region only on pressure; foot entirely free from pain; bowels moved daily once or twice; good appetite, but diet was limited to milk, beef juice, custard, soup, etc.

On the ninth day patient was placed on a more liberal diet. Capsules of colchicum were given three times a day, and sodium salicylate, 0.30, in tablet after each meal.

Early in January there was an attack of slight pain in shoulder joints and of increased tenderness over appendix. These symptoms promptly subsided upon the exhibition of colchicum and lithium twice daily. For several days after this attack there was a sensation of burning or tearing in minute points through muscles of arms and shoulders.

The Annual of Treatment mentions two cases of "rheumatic appendicitis," and the journals occasionally mention gout as a possible cause of appendicitis.

The case herein described seems to be an attack of gout of the appendix and probably also of the cæcum.

There was probably a previous slight attack, and the walls of the appendix have become somewhat thickened. There will no doubt be recurrences, but the condition of the heart precludes operation except as a last resort.

The recognition of a gouty origin in a case of appendicitis will render it generally possible for the attending physician to overcome the acute symptoms by prompt and vigorous treatment, and enable him to choose his time for operating—i. e., between the acute attacks, when the percentage of mortality is so much lower than it is from operations performed during the acute stage.

The danger of suppuration and perforation will be much less, in my opinion.

ON NORMAL GROWTH UNDER THE INFLUENCE OF GYMNASTIC EXERCISE.

By Henry G. Beyer, *Surgeon, United States Navy.*

The tables which accompany this the fourth annual report, transmitted from the department of physical training at the Naval Academy to the Bureau of Medicine and Surgery, represent the results of the semiannual growth in certain stated dimensions, obtained through systematic exercise during the past year from cadets of the fourth class.

For purposes of future and more extended reference to these tables the same system of tabulation has been followed out as in previous reports, and any further explanation as regards their significance is therefore unnecessary. It is, furthermore, deemed unnecessary to insist on or emphasize the great desirability of continuing these annual reports, for it is very clear that the value or worthlessness of any method can only be accurately measured by a careful and systematic study of the results obtained. As the number of observations increase from year to year their value must become greater and the conclusions that are drawn from them truer and more convincing.

Table 5 shows the average results obtained during the last four years.

Table I.—*Increase in height in millimeters.*

Number.	Age.	First examination.	Second examination.	Gain.	Number.	Age.	First examination.	Second examination.	Gain.
1	18.2	1,810	1,820	10	33	19.1	1,730	1,740	10
2	18.1	1,806	1,810	4	34	17.2	1,612	1,640	28
3	19.7	1,710	1,720	10	35	19.7	1,780	1,790	10
4	17	1,818	1,820	2	36	18.8	1,724	1,730	6
5	17.2	1,776	1,790	14	37	17.9	1,800	1,810	10
6	18.4	1,700	1,700	0	38	18.9	1,720	1,720	0
7	18.1	1,736	1,738	2	39	19.11	1,735	1,742	7
8	18.1	1,618	1,620	2	40	16.5	1,660	1,700	40
9	17.6	1,746	1,764	18	41	17.2	1,695	1,701	6
10	20	1,833	1,840	7	42	19.1	1,792	1,792	0
11	17.1	1,688	1,710	22	43	19	1,730	1,750	20
12	19.1	1,770	1,780	10	44	16.4	1,670	1,700	30
13	18.3	1,770	1,790	20	45	18.1	1,752	1,760	8
14	19.3	1,710	1,714	4	46	20	1,730	1,750	20
15	18.2	1,715	1,720	5	47	18.5	1,780	1,780	0
16	15.7	1,680	1,715	35	48	16.9	1,640	1,660	20
17	19.1	1,678	1,688	10	49	18.4	1,600	1,620	20
18	20	1,770	1,776	6	50	18.01	1,660	1,662	2
19	18.11	1,688	1,695	7	51	17.1	1,680	1,683	3
20	19.1	1,640	1,650	10	52	18	1,780	1,786	6
21	15.7	1,760	1,780	20	53	16.6	1,806	1,838	32
22	15.9	1,550	1,585	35	54	16.6	1,690	1,710	20
23	18.6	1,770	1,776	6	55	17.8	1,740	1,760	20
24	17.1	1,745	1,760	15	56	19	1,730	1,732	2
25	19	1,728	1,740	12	57	18.3	1,690	1,695	5
26	18.11	1,790	1,790	0	58	16.9	1,745	1,755	10
27	18.6	1,765	1,765	0	59	18.6	1,720	1,730	10
28	18.1	1,820	1,834	14	60	18.6	1,745	1,756	11
29	17.1	1,790	1,796	6	61	19.9	1,810	1,810	0
30	17.1	1,810	1,815	5					
31	18	1,758	1,768	10	Averages.	17.3	1,723	1,734	11
32	19.3	1,755	1,758	3					

TABLE II.—*Increase in weight in kilos.*

Number.	Age.	First examination.	Second examination.	Gain.	Loss.
1	18.2	66	66	0	......
2	18.1	66.5	70	3.5	......
3	19.7	60	64.5	4.5	......
4	17	65.5	66	.5	......
5	17.2	62.5	65	2.5	......
6	18.4	53.5	62	8.5	......
7	18.1	65	68	3	......
8	18.1	56	59	3	......
9	17.6	56.5	61	4.5	......
10	20	69	72	3	......
11	17.1	52	59	7	......
12	19.1	65	69	4	......
13	18.3	68	69	1	......
14	19.3	54	62	8	......
15	18.2	63	70	7	......
16	15.7	53	55	2	......
17	19.1	57	56	......	1
18	20	73	77	4	......
19	18.11	53	58	5	......
20	19.1	60	62	2	......
21	15.7	59	63	4	......
22	15.9	43	49	6	......
23	18.6	74	74	0	......
24	17.1	58	62	4	......
25	19	64	67	3	......
26	18.11	72	73	1	......
27	18.6	70	72	2	......
28	18.1	60	64	4	......
29	17.1	71	71	0	......
30	17.1	74	77	3	......
31	18	63	68	5	......
32	19.3	67	68	1	......
33	19.1	59	65	6	......
34	17.2	50	56	6	......
35	19.7	66	70	4	......
36	18.8	67	69	2	......
37	17.9	65	70	5	......
38	18.9	60	62	2	......
39	19.11	66	70	4	......
40	16.5	55	58	3	......
41	17.2	61	64	3	......
42	19.1	66	68	2	......
43	19	66	69	3	......
44	16.4	56	61	5	......
45	18.1	65	64	......	1
46	20	60	63	3	......
47	18.5	62	64	4	......
48	16.9	56	69	13	......
49	18.4	54	56.5	2.5	......
50	18.1	67	67	0	......
51	17.1	57	56	......	1
52	18	65	67	2	......
53	16.6	65	69	4	......
54	16.6	56	58	2	......
55	17.8	58	62	4	......
56	19	64	68	4	......
57	18.3	63	66	3	......
58	16.9	57	59	2	......
59	18.6	65	65	0	......
60	18.6	65	69	4	......
61	19.9	64	71	7	......
Averages.	17.3	61.6	65	3.4	......

TABLE III.—*Increase in lung capacity in cubic inches.*

Number.	Age.	First examination.	Second examination.	Gain.	Loss.
1	18.2	270	250	......	20
2	18.1	300	310	10	......
3	19.7	240	250	10	......
4	17	260	260	0	......
5	17.2	260	260	0	......
6	18.4	250	280	30	......
7	18.1	265	265	0	......
8	18.1	220	220	0	......
9	17.6	250	250	0	......
10	20	230	260	30	......
11	17.1	210	230	20	......
12	19.1	260	280	20	......
13	18.3	270	310	40	......
14	19.3	270	280	10	......
15	18.2	260	275	15	......
16	15.7	190	200	10	......
17	19.1	235	250	15	......
18	20	290	300	10	......
19	18.11	200	200	0	......
20	19.1	220	250	30	......
21	15.7	210	230	20	......
22	15.9	135	160	25	......
23	18.6	280	310	30	......
24	17.1	220	250	30	......
25	19	250	275	25	......
26	18.11	240	260	20	......
27	18.6	250	250	0	......
28	18.1	270	280	10	......
29	17.1	280	290	10	......
30	17.1	280	290	10	......
31	18	250	260	10	......
32	19.3	250	250	0	......
33	19.1	260	270	10	......
34	17.2	210	250	40	......
35	19.7	300	310	10	......
36	18.8	230	250	20	......
37	17.9	230	270	40	......
38	18.9	280	280	0	......
39	19.11	250	250	0	......
40	16.5	220	250	30	......
41	17.2	260	270	10	......
42	19.1	250	250	0	......
43	19	230	240	10	......
44	16.4	210	220	10	......
45	18.1	280	295	15	......
46	20	220	240	20	......
47	18.5	260	270	10	......
48	16.9	210	250	40	......
49	18.4	210	230	20	......
50	18.1	250	270	20	......
51	17.1	230	240	10	......
52	18	260	270	10	......
53	16.6	250	290	40	......
54	16.6	220	250	30	......
55	17.8	240	270	30	......
56	19	210	250	40	......
57	18.3	250	270	20	......
58	16.9	250	270	20	......
59	18.6	270	290	20	......
60	18.6	290	310	20	......
61	19.9	230	260	30	......
Averages.	17.3	245	261.6	16.6	......

TABLE IV.—*Increase in total strength in kilos.*

Number.	Age.	First examination.	Second examination.	Gain.	Loss.	Number.	Age.	First examination.	Second examination.	Gain.	Loss.
1	18.2	457	554	87	......	33	19.1	493	626	133	......
2	18.1	580	564	......	16	34	17.2	305	492	187	......
3	19.7	398	577	179	......	35	19.7	504	571	67	......
4	17	518	519	1	......	36	18.8	535	578	43	......
5	17.2	440	539	99	......	37	17.9	386	625	249	......
6	18.4	410	505	95	......	38	18.9	543	589	46	......
7	18.1	737	801	64	......	39	19.11	649	673	24	......
8	18.1	526	538	12	......	40	16.5	450	532	82	......
9	17.6	455	598	143	......	41	17.2	423	492	69	......
10	20	587	690	103	......	42	19.1	428	495	67	......
11	17.1	327	419	92	......	43	19	506	590	84	......
12	19.1	435	567	132	......	44	16.4	416	486	70	......
13	18.3	448	570	122	......	45	18.1	520	552	32	......
14	19.3	420	490	70	......	46	20	395	511	116	......
15	18.2	472	542	70	......	47	18.5	517	585	68	......
16	15.7	281	408	127	......	48	16.9	348	474	126	......
17	19.1	454	566	112	......	49	18.4	422	550	128	......
18	20	636	745	109	......	50	18.1	738	794	56	......
19	18.11	301	486	185	......	51	17.1	465	574	109	......
20	19.1	447	537	90	......	52	18	457	576	119	......
21	15.7	345	476	131	......	53	16.6	420	576	156	......
22	15.9	316	400	84	......	54	16.6	347	348	1	......
23	18.6	441	584	143	......	55	17.8	364	447	83	......
24	17.1	418	478	60	......	56	19	379	657	278	......
25	19	631	696	65	......	57	18.3	468	583	115	......
26	18.11	603	552	......	51	58	16.9	329	474	145	......
27	18.6	663	621	......	42	59	18.6	385	477	92	......
28	18.1	455	582	127	......	60	18.6	397	510	113	......
29	17.1	497	631	134	......	61	19.9	437	630	193	......
30	17.1	482	602	120	......						
31	18	532	652	120	......	Averages.	17.3	464	562	98	......
32	19.3	555	603	48	......						

TABLE V.—*Showing average of semiannual increases in height, weight, lung capacity, and total strength for a period of four years.*

Year.	Number of observations.	Average age.	Average height.			Average weight.			Average lung capacity.			Average total strength.		
			First examination.	Second examination.	Gain.	First examination.	Second examination.	Gain.	First examination.	Second examination.	Gain.	First examination.	Second examination.	Gain.
			Mm.	*Mm.*	*Mm.*	*Kilos.*	*Kilos.*	*Kilos.*	*C.in.*	*C. in.*	*C. in.*	*Kilos.*	*Kilos.*	*Kilos.*
1892–93	50	18	1,721	1,729	8	60	63.3	3.3	246	256	10	385	508	123
1893–94	74	18	1,709	1,722	13	58.5	62.6	4.1	242	260	18	422	528	106
1894–95	58	17.10	1,709	1,717	8	60.7	64	3.3	239	254	15	463	582	119
1895–96	61	17.3	1,723	1,734	11	61.6	65	3.4	245	261.6	16.6	464	562	98
Averages	....	17.9	1,716	1,726	10	60.1	63.7	3.6	243	258	15	444	545	101

Table V gives the number of observations that have up to the present accumulated as 243. This number is considered sufficiently large to allow new and more important deductions to be drawn from these observations by a simple arrangement of the figures in accordance with different principles. For example, it is well known and has repeatedly been demonstrated by facts and figures, that the amount of absolute annual growth in certain given dimensions in the case of the human subject differs quite perceptibly between different years. Hence, a classification of the material at hand, according to age, has now become not only possible, but necessary. Moreover, the influence of exercise on growth, provided such influence exists and is at all appreciable, must admit of correct measurement. But, in order to arrive at a correct estimate of the amount of influence of exercise on growth and express it in figures, it is clearly not sufficient to note or record the various increases or changes in several different dimensions that take place or follow a course of exercises taken in a gymnasium in the case of a number of persons, and which have, so far at least, been determined by two sets of measurements—taken before the course began and after it had ended. This work, necessary though it be, is merely preliminary, for in the various changes or increases noted after this manner are contained not only those values that may be due to the exercise performed but also those that must be due to the natural growth and development, and which are quite naturally expected to occur during the period of life occupied by each individual person included in the series, as well as by the time occupied by the observations themselves. These two different values must be separated, and in order to determine with exactness what increment of height, weight, lung capacity, and total strength is due to exercise, we must first of all ascertain what the amount of normal growth in these various dimensions is, or that may be expected to take place during such time as was occupied by the exercise and for the period of life of the individuals represented in the observations.

In other words, the absolute annual growth values for each and all the different dimensions under consideration must first be ascertained before we can possibly deduce those values which may result from a certain given amount of exercise, and before, it would seem, we had any very valid reason to speak of the effects of exercise on growth and development. Such material, however, it was soon found was not in existence. Normal growth tables from foreign sources, even if they had covered the period of growth which we had to deal with, could not have been utilized for our purposes. The tables that had been published in this country, and which might have served for comparison with ours, did not cover the period of life which we had to deal with. Thus, everything in the situation pointed to the necessity of working out normal growth tables from material that had accumulated at the Naval Academy. Thanks to the early introduction into the Academy of a system of careful measuring and recording the results of physical examinations, such material was available, and all that was needed was to put it into the required form, which was done.[1]

It is now, comparatively speaking, an easy matter to find out not only whether physical training in a general way has any marked influence on growth but also whether the particular method of training which was introduced into the Academy about four years ago has had any influence as regards height, standing, weight, lung capacity, and total strength over and above that which was in vogue before that time.

The ages of the cadets entering the Academy vary from 16 to 20 years, the average age during the last four years having steadily remained at about 18. Hence the period of growth with which our observations deal covers the four years from 16 to 20. Dividing now our 243 observations of the last four years and distributing them according to age and in agreement with the principle of the nearest birthday, multiplying, furthermore, by two the semiannual values obtained in the gymnasium, thus converting them into annual ones, they are now ready for comparison with the tables giving the normal annual absolute growth in the same dimensions, and which normal values were calculated from 4,537 cadets and candidates of previous years. The homogeneity of the material thus brought together for purposes of comparison, springing practically from the same sources, must be apparent, and adds no little value to whatever results we may derive from our calculations.

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[1] "The growth of United States naval cadets," Proceedings U. S. Naval Institute, Vol. XXI, No. 2.

As regards height alone, I am in the fortunate position for making a comparison still more valuable than that mentioned above. Being in the possession of the complete annual records of the heights of 186 cadets, each beginning at the age of 16 and ending at 22, I was enabled to produce a table according to the "individualizing method," which table is of infinitely greater value than the one obtained by the "generalizing method," in spite of the numbers in the table produced by the latter method being much larger.

The possession of these two tables, both showing the normal amount of growth in height, but derived according to different methods, enables me not only to compare them both with those obtained from the gymnasium records, but also to test, in a measure, the comparative value of the two above-mentioned methods, by which each table, showing the normal values, was produced.

Comparing these two tables with each other, the first thing we will notice is that the distribution of the annual growth values is very different in them, but when we add the different annual values together in each table separately their respective sums are absolutely identical, being in both 69. I am therefore led to believe that the sums in each and both are correct and indicate in no uncertain terms the exact normal amount of growth in height that may on the average be expected to occur during that period of life.

The additional fact, plainly seen by a comparison of the two tables, that the distribution of the values in the table produced by the individualizing method is so much nearer to the truth and, consequently, to nature than that shown in the other table, proves conclusively that the individualizing method is the only one that will ever give us the correct values of the absolute annual growth occurring between two successive years of life.

On examining the figures representing the averages derived from the individual records of the 186 cadets (see Table I, 2) and comparing them with those obtained from the 243 cadets who were under observation in the gymnasium (see Table I, 3) a very striking similarity as regards distribution of the annual growth values may be noticed at once.

The conclusion is quite obvious and can not be avoided that a positive increase in height (standing) may be attained through properly systematized gymnastic exercise, administered in accordance with the best principles of human physiology and applied between the years 16 and 20. Our table shows that this increase amounts to 42 millimeters over and above that which may be expected to take place without such exercise, 42 representing the difference between 111 and 69.

The largest gain in height is made between 16 and 17 years. This fact is in perfect accord with the laws of growth, for it is well known that the younger a person the greater also his chances for growth, and it would therefore seem a most natural inference to make, namely, that any agent influencing growth favorably would likewise have its best chances to assert itself at that time.

It is, perhaps, not altogether superfluous to make a note of the fact at this point that all the cadets before coming to me for the first anthropometric examination have had at least one month's setting-up drill, swimming, and infantry drill. About 50 per cent of their number entering during the month of June have of course had these same drills for a much longer time. All of them, moreover, having passed a satisfactory physical examination before a board of experienced medical examiners, the material on which these observations were made may safely be accepted as being normally developed and well set up at the time of their first examination by me.

According to the figures shown in Table I, the total amount of increase in height (standing), due to exercise alone and for the entire period of four years, is 42 millimeters, or about 1¾ inches. This amount, most probably, is not quite up to the true gain, but falls rather below it; for our normal standards have been obtained from naval cadets whose training at the Academy as well as on board ship implies an amount of exercise far above that which obtains in the education of the average student at the high school or college and from the effect of which it was of course impossible to disentangle our normal averages in both cases.

Now a gain in height of 1¾ inches during four years of continued systematic exercise may not seem such a great reward for the time spent. On further thought, however, it is of the greatest importance when applied to an entire nation, or even part of it, whose very existence must depend on the physical resources of its individual members, as it often does, even among the most civilized.

Throughout all these observations it was repeatedly shown that the taller the individual at the beginning, the greater also was the amount of strength and weight gained by the exercise he was made to perform. It was observed invariably in every series of observations that those of the cadets whose gain in total strength was over 100 kilos were, on the average, also taller and heavier than those whose gain in this respect fell below 100 kilos. An increase in height, therefore, means a corresponding increase in strength as well.

Consequently we are forced to the opinion that height is the most important consideration in an investigation of this character. The agent, whatever it may be, which influences height must be profound as well as far-reaching, for growth in height means growth of bone. Growth in height practically comes to an end at the age of 21, while growth in weight and strength may be increased almost indefinitely and to a much later age, and whenever we speak of the growth of man in the most general sense we always imply growth in height standing.

The normal-growth tables published in this country and in Europe have uniformly shown that the period of the most rapid growth for the average boy occurs between the years 13 and 15. Our observations begin with boys of 16 years of age, a time, then, when the period of the most rapid growth for the average boy is passed. Now if, as is clearly shown by our table, it is still possible to add 1¾ inches to our height by means of systematized exercise after the age of 16, the inference is rendered extremely probable that, cæteris paribus, we could add still more to it if such exercise were applied earlier. This must, of course, be equally true for at least some of the other dimensions, always, of course, keeping steadily in mind and making due allowance for the law that the earlier growth is acquired the slower it becomes as we gradually approach the twenty-first year of life. A simple inspection is all that is necessary to find the respective increases as regards weight, lung capacity, and total strength that were calculated from the same material and which are represented by the figures given in Tables II, III, and IV.

TABLE I.—*Height standing.*

	Average increases, in millimeters, between the years—					
	16–17.	17–18.	18–19.	19–20.	20–21.	Total.
1. From records of 4,537 naval cadets,[1] normal values	28	6	15	19	1	69
2. From records of 186 continuous individual cadets, normal values	28	20	12	7	2	69
3. From records of 243 cadets influenced by gymnastic exercise	48	26	16	12	9	111

[1] In this number are included several hundred who left but the records of a single examination, were afterwards rejected in the mental examination, and consequently never became cadets. See report of Capt. P. H. Cooper, superintendent.

TABLE II.—*Weight.*

	Mean increases, in kilos, between the years—					
	16–17.	17–18.	18–19.	19–20.	20–21.	Total.
1. Records of 4,537 naval cadets, normal values	3.6	3.2	2.4	0.7	0.2	10.1
2. Records of 243 cadets influenced by gymnastic exercise	8.4	7.3	5.7	6.3	7.2	43.9

TABLE III.—*Lung capacity.*

	Mean increase, in liters, between the years—					
	16–17.	17–18.	18–19.	19–20.	20–21.	Total.
1. Records of 4,537 cadets, normal values	0.250	0.167	0.152	0.083	.00	0.652
2. Records of 243 cadets influenced by gymnastic exercise	1.181	.761	.755	.466	.628	3.791

TABLE IV.—*Total strength.*

	Mean increase, in kilos, between the years—					
	16–17.	17–18.	18–19.	19–20.	20–21.	Total.
1. Records of 605 naval cadets, normal values	39	56	43	69	61	268
2. Records of 243 cadets influenced by gymnastic exercise	242	203	223	205	229	1,102

THE VIABILITY OF THE CHOLERA SPIRILLUM IN ITS RELATION TO CERTAIN FRUIT ACIDS.

By THOMAS C. CRAIG, *Passed Assistant Surgeon, United States Navy.*

All acids exert an inhibitory action on the growth of the cholera spirillum. All mineral acids, if sufficiently concentrated, will destroy its vitality. The fruit acids will in like manner destroy the vitality of this spirillum, provided they be concentrated. Most of our fruits are acid in reaction, the acidity varying with the kind and ripeness.

In selecting the fruits for the following experiments due regard was exercised to procure those which represented the actual normal condition in which they would be in the market and in which they would be placed on our tables. For example, overripe or underripe fruits were avoided. This was done in order to procure those in which there would be about the natural acidity present, which to our sense of taste would designate the fruit as ripe.

Pure cultures of the cholera spirillum were used, and in the different manipulations care was taken to prevent contaminations of the cultures and inoculations. The incubating was protected from the light in order to remove the deleterious influence of sunlight, which we know, is in itself inhibitory to the growth of the cholera spirillum. Desiccation was obviated by the natural moisture of the fruits. The fruits selected were those commonly found in the markets during the summer months.

The point to determine was how long a good, active growth of the cholera spirillum would live in contact with the cut surface of these fruits. Thus it was determined to try and arrive at the length of time it would take these weak fruit acids to render the cholera spirillum no longer able to propagate itself.

This becomes a very important question, for we well know that water is almost the sole means by which this pathogenic bacterium is conveyed, hence it is by the infected water which, having been brought in contact with the fruits, deposits the bacteria on them, and thus the fruits often become the means of conveying the infection. The cholera spirillum will overcome or, in other words, resist the acidity of some fruits for a very long while.

The cholera spirillum will only grow in an alkaline medium. It may be that the cholera spirillum is able to produce enough of some alkaline substance to neutralize a very weak fruit acid, and thus render its surroundings suitable for its own propagation. The technique which was carried out was the same with all the fruits.

Fresh cultures of the cholera spirillum were made in each case. Before inoculating the cut surface of the fruits controls were made, and these controls were incubated under the same conditions that the inoculations were.

The inoculated fruits were always placed in a dark closet, and as these experiments were carried on in the summer months it was judged that the ordinary room temperatures were sufficient. Indeed, this was the temperature that the fruits would ordinarily meet with in our markets during the fruit season, and hence would be the conditions under which the cholera spirillum would either live or die.

The knife used for making the sections, the forceps necessary to hold the fruit, the pipette with which the cholera culture was transferred to the cut surface of the fruit, were all made perfectly sterile each time before using by passing them through the flame of a Bunsen burner.

The bacteria dishes were always exposed for one hour to a temperature of 150° C. before the cut sections of the fruit were placed in them.

On May 16, 1895, a peptone solution culture medium was inoculated with a pure culture of the cholera spirillum, procured in 1892 by the director of the Hoagland laboratory from cholera cases at Swinburne Island, in New York Harbor. Placed inoculated tube in incubator. Sterilized a bacteria dish at 150° C. for one hour.

APPLE.

May 18: The first fruit selected for experiment was the apple. Although late in the season for this particular fruit, I was fortunate in procuring a fine specimen—a large juicy one, with a slightly acid taste. Prepared section of the apple by slicing with a sterilized knife, and placed it in the sterilized bacteria dish. Tested reaction of cut surface of apple and found it to be strongly acid. Made mount from the cholera culture of the 16th instant (2 days old) and found plenty of the spirilla of cholera and the comma forms. Inoculated a tube of peptone solution with a small piece of the apple to act as a control and placed tube in the incubator. Inoculated the section of the apple with the cholera culture, placing sterile tacks around the inoculated area in order that I could again find it.

I am aware that Dr. Bolton has demonstrated by experiment that certain metals will inhibit the growth of bacteria in their immediate neighborhood. In my experiment I placed the sterile tacks at some distance from the inoculated area, and further, in another series of experiments, I obtained the same results where the infected area was marked out by scratching on the surface of the cut fruit. At the end of thirty minutes, one hour, and two hours, respectively, I inoculated peptone solution from the area before planted with the cholera culture and placed tubes in the incubator.

The dark closet in which the infected fruit was placed had a temperature of about 80° F.; indeed this temperature did not vary more than 5° or 10° in any of these experiments.

May 21: The control tube did not show any growth. All the other tubes showed growth; a mount made from each one showed the cholera spirillum, and acid added to each one gave the cholera red reaction.

May 30: Similar inoculations into peptone solution were made from the infected area on May 23, 25, 28, and 29. All of these inoculations, except the one made on the 29th, showed growth; a mount from each one showed the cholera spirillum, and acid added to each one gave the cholera red reaction. The tube inoculated on the 29th did not show any growth.

This experiment proved that the cholera spirillum lived ten days after being planted on the sterile cut surface of this apple; i. e., the fruit acid of the apple was resisted for that length of time. The spirillum died out on the eleventh day.

BANANA.

May 18: The next fruit taken was the banana. Removed the skin and sliced the banana with a sterilized knife and placed the cut sections in a sterilized bacteria dish, mapping out areas on the slices with sterilized tacks, as was previously done on the apple. Planted a fresh culture of the cholera spirillum in the areas mapped out. Tested surface of banana and found it to be slightly acid. Inoculated a tube of peptone solution with a small piece of the banana as a control.

At the end of thirty minutes and of one hour, and also on the 21st, 23d, and 25th instant, respectively, made inoculations into peptone solution from the infected area of the fruit, and placed tubes in the incubator and the infected fruit in a dark closet.

May 26: The control tube did not show any growth. All the other tubes showed growth, except the tube inoculated on the 25th instant, it remaining perfectly clear. A mount made from each one of the other tubes showed the cholera spirillum, and acid added to each one gave the cholera red reaction. This experiment showed that the cholera spirillum lived in contact with the cut surface of this fruit for five days, dying out on the sixth day. The cholera spirillum had therefore resisted the acidity of this fruit for five days.

STRAWBERRY.

The next fruit experimented with was a strawberry.

May 25: Sliced fruit with a sterilized knife and placed section in a sterilized bacteria dish. Made control inoculation into peptone solution of a portion of the pulp of the cut section. Tested reaction of cut surface of fruit and found it to be strongly acid. Inoculated cut surface of fruit with a fresh culture of the cholera spirillum. At the end of thirty minutes and of one hour and also at the end of twenty-four hours made inoculations into peptone solution from the infected area of the fruit. Placed infected fruit in dark closet and the inoculated tubes in the incubator.

May 27: The control tube did not show any growth. All the other tubes showed growth, except the one inoculated at the end of twenty-four hours, which remained perfectly clear. A mount made from each tube which showed growth showed the cholera spirillum, and acid added to each one gave the cholera red reaction. This experiment showed that the cholera spirillum lived for one hour, but did not live twenty-four hours in contact with the cut surface of this fruit. It was unable to resist the acidity of this fruit for twenty-four hours.

PINEAPPLE.

June 15: The next fruit selected was the pineapple. Sliced fruit with a sterilized knife and placed section in a sterilized bacteria dish. Tested reaction of cut surface of the fruit and found it to be weakly acid. Placed a small piece from the cut surface of the fruit into peptone solution to act as a control. Inoculated cut surface of fruit with a fresh culture of the cholera spirillum and placed bacteria dish in dark closet. Placed control tube in incubator.

June 16: Control tube did not show any growth. Inoculated peptone solution from the infected area of the fruit and placed tube in incubator.

June 17: Tube did not show any growth, thus showing that the cholera spirillum had died out within the first twenty-four hours. The surface of this fruit, although weakly acid, proved to be a poor culture field for this spirillum, it not being able to resist this weak acid one day.

APRICOT.

The next fruit chosen was the apricot.

June 15: Sliced fruit with a sterilized knife and placed section in a sterilized bacteria dish. Tested reaction of cut surface of fruit and found it to be feebly acid. Placed a small piece from the cut section of the fruit in peptone solution to act as a control. Inoculated cut surface of fruit with a fresh culture of the cholera spirillum, and placed bacteria dish in dark closet. Placed control tube in incubator.

June 16: Control tube did not show any growth, but remained perfectly clear. Made inoculations into peptone solution from the infected area of the fruit on the 16th, 17th, and 18th instants and placed tubes in incubator.

June 19: Inoculations showed the following: The ones made on the 16th and 17th showed growth, mounts made from them showed the cholera spirillum, and acid added to each one gave the cholera red reaction. The inoculation made on the 18th did not show any growth, but remained perfectly clear, this experiment proving that the cholera spirillum had been able to resist this fruit acid forty-eight hours, but not seventy-two hours.

ORANGE (SOUR).

The next fruit experimented with was an orange.

June 20: This fruit was what is commonly known as a sour orange. Sliced fruit with a sterilized knife and placed section in a sterilized bacteria dish. Tested reaction of the cut surface of the fruit and found it to be strongly acid. Placed a small piece from the cut surface of the fruit in peptone solution to act as a control. Inoculated the cut surface of the fruit with a fresh culture of the cholera spirillum. Made inoculation into peptone solution from the infected area of the cut surface of the fruit at intervals of five, ten, fifteen, twenty, and thirty minutes and also at the end of one hour. Placed bacteria dish containing the section of the infected fruit in a dark closet and the inoculated and control tubes in incubator.

June 21: The tubes showed the following results: The control tube did not show any growth, but remained perfectly clear. The inoculation made at the end of five minutes showed growth, a mount showed the cholera spirillum, and acid gave the cholera red reaction. The tubes inoculated at the end of ten, fifteen, twenty, and thirty minutes and at the end of one hour did not show any growth. They all remained perfectly clear.

This experiment showed that the cholera spirillum lived for five minutes in contact with the cut surface of this fruit, but that it was not able to withstand the fruit acid for ten minutes, it dying out between five and ten minutes after contact.

As this specimen of orange was a seemingly very acid one, it was determined to obtain a sweet Florida orange and repeat the experiment on it.

ORANGE (SWEET FLORIDA).

June 25: Procured a sweet Florida orange, sliced it with a sterilized knife, and placed the section in a sterilized bacteria dish. Tested reaction of the cut surface of the fruit and found it to be decidedly acid. Teased off a small piece from the cut section in the bacteria dish and inoculated it into peptone solution to act as a control. Inoculated the cut surface of the fruit in the bacteria dish with a fresh culture of the cholera spirillum. Made inoculations into peptone solution from the infected surface of the fruit at the end of five, ten, fifteen, twenty, and thirty minutes and at the end of one, two, and three hours. Placed inoculated orange in a dark closet and the inoculated tubes in the incubator.

June 26: The inoculated tubes gave the following results: The control tube did not show any growth, but remained perfectly clear. The inoculations made at the end of five, ten, fifteen, twenty, and thirty minutes showed growth, a mount made from each one showing the cholera spirillum, and acid added to each one showing the cholera red reaction. The inoculations made at the end of one, two, and three hours did not show any growth, but remained perfectly clear.

This experiment showed that the cholera spirillum lived for thirty minutes, but not for one hour, in contact with the cut surface of this orange. In other words, it resisted the acid of this fruit for thirty minutes.

I might mention here that this second experiment with the orange was made in order to see the relative effect of what is called a more or less sour orange with what is pronounced to be a very sweet orange, the point being this, Does the sour orange contain more acid than the sweet one, or do they both contain about the same amount of acid, the acid in the sweet one being masked by sugar? If this latter had been the case, we would have expected the cholera spirillum to have died out in the same time it did on the sour orange. The results of the experiment will bear me out in the fact that the very acid or sour oranges are much more fatal to the cholera spirillum than the sweet ones.

LEMON.

June 20: The next fruit selected was the ordinary lemon.

Made a section of the fruit with a sterilized knife and placed the section in a sterilized bacteria dish. Tested reaction of the cut surface of the fruit and found it to be strongly acid. Teased off a small piece from the section in the bacteria dish and placed it in a peptone solution to act as a control. Inoculated the cut surface of the section in the bacteria dish with a fresh culture of the cholera spirillum. Made inoculations into peptone solution from the infected surface of the fruit at the end of five, ten, fifteen, twenty, and thirty minutes and at the end of one hour. Placed bacteria dish in a dark closet and the inoculated tubes in the incubator.

June 21: Neither the control tube nor the inoculations made at the end of five, ten, fifteen, twenty, and thirty minutes and at the end of one hour showed any growth. They all remained perfectly clear. This experiment showed that the cholera spirillum died out before the end of five minutes after contact with the cut surface of this fruit. In this case the cholera spirillum was not able to withstand the acid of this fruit for five minutes.

WATERMELON.

The next fruit taken was the watermelon.

June 25: Made a section of the watermelon with a sterilized knife, and placed section in a sterilized bacteria dish. Tested reaction of the cut surface of the fruit and found it to be faintly acid. Removed a small piece of the cut section in the bacteria dish and placed it in peptone solution to act as a control. Inoculated the section of fruit in the bacteria dish with a fresh culture of the cholera spirillum. Made inoculations into peptone solution from the infected area of the fruit at the end of five, ten, fifteen, twenty, and thirty minutes, and at the end of one, two, and three hours, and on the following dates: June 26, 27, 28, 29; July 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 15, 18, 21, 24, 27, 31; August 3, 6, 7. All of these inoculations, except the control tube, showed growth, a mount from each one showing the cholera spirillum, and acid added to each one giving the cholera red reaction.

At this stage in this experiment the inoculated watermelon had so far disintegrated and softened that there was scarcely anything of it left except a pulpy mass, so the experiment was discontinued. The results obtained showed that the cholera spirillum had lived for forty-two days in contact with the cut surface of this watermelon, and that when the experiment was abandoned the cholera spirillum was yet in an active state. Perhaps it would have lived many more weeks had not conditions arisen which rendered further experimentation inexpedient.

CANTALOUPE.

The next fruit selected was a cantaloupe.

August 17: Procured a medium ripe cantaloupe, and prepared a section of it with a sterilized knife, and placed the section in a sterilized bacteria dish. Tested reaction of the cut surface of the fruit and found it to be faintly acid. Removed a small piece from the cut section in the bacteria dish and inoculated it into a peptone solution to act as a control. Inoculated the cut surface of the fruit in the bacteria dish with a fresh culture of the cholera spirillum, and placed bacteria dish containing the infected fruit in a dark closet and the control tube in the incubator.

August 18: The control tube did not show any growth, but remained perfectly clear. Inoculated peptone solution from the infected area of the fruit on the following days, and placed the tubes in the incubator: August 18, 20, 22, 24, 26, 28, 31, and September 1. All of these tubes showed growth. A mount made from each one showed the cholera spirillum, and acid added to each one gave the cholera red reaction.

The specimen of cantaloupe had by this time softened to a pultaceous mass, covering the bottom of the bacteria dish, so the experiment was discontinued. The result showed that the cholera spirillum had lived for fourteen days in contact with the cut surface of this cantaloupe, and had not the fruit disintegrated the experiment might have shown the almost indefinite growth of this spirillum, for there were present in this experiment many favorable factors conducive to the growth of this particular bacterium, viz, heat, moisture, and above all, little or no acidity.

I was very anxious to repeat this experiment, as the conditions were so favorable to the growth of the cholera spirillum until the cantaloupe became a pultaceous mass. In order to obviate this I procured a second cantaloupe, slightly less ripe than the first one. Prepared and sterilized a bacteria dish, and made a section of the cantaloupe with a sterilized knife and placed the section in the sterilized bacteria dish. I then inoculated a peptone solution from the cut surface of the section of the fruit contained in the bacteria dish, in order to act as a control, and placed it in the incubator. Tested reaction of the cut surface of the cantaloupe and found it to be faintly acid. Inoculated the cut section of the fruit in the bacteria dish with a fresh culture of the cholera spirillum and placed it in a dark closet.

I did not disturb this inoculated specimen for two weeks, as I felt sure that the cholera spirillum would live as long on this second specimen as it did on the first one, for the reason that the conditions were precisely similar. At the end of the two weeks I found that this second specimen had also disintegrated into a pultaceous mass, just like the first specimen had.

No further trials were made with this fruit.

I should have mentioned that the control tube in this second specimen did not show any growth.

PEACH.

The next and last fruit selected in this series of experiments was the peach.

August 17: Procured a ripe peach and made a section of it with a sterilized knife, and placed the section in a sterilized bacteria dish. The section of the peach had the skin removed, and was not cut deep enough to reach the stone. This was done in order to avoid any bacterial contamination, which might have penetrated to the stone through the wound made when the peach was detached from the stem; for it is a common occurrence to find bacterial growths, even in the seed of the peach stone. Tested reaction of the cut surface of the peach and found it to be acid. Made inoculation into peptone solution from the cut surface of the section of the peach in the bacterial dish to act as a control, and placed tube in the incubator. Inoculated the section of the fruit in the bacteria dish with a fresh culture of the cholera spirillum, and placed dish in a dark closet.

August 18: The control tube did not show any growth, but remained perfectly clear.

Made inoculations into peptone solution from the infected area of the cut surface of the peach on the following dates: August 18, 19, and 20, and placed tubes in incubator. All of these inoculations showed growth except the one made last, which remained perfectly clear. A mount made from each one of the other tubes showed the cholera spirillum, and acid added to each one gave the cholera red reaction.

This experiment showed that the cholera spirillum had lived over twenty-four hours in contact with the cut surface of this peach, but that it did not live for forty-eight hours. In other words, the cholera spirillum had resisted the acid of this fruit for more than twenty-four hours, but less than forty-eight hours.

In summing up this series of experiments the following data are deduced:

A fresh active culture of the cholera spirillum lived in contact with the cut surface of these fruits, as follows: Apple, ten days; banana, five days; strawberry, one hour; pineapple, less than twenty-four hours; orange (sour), five minutes; orange (sweet Florida), thirty minutes; lemon, less than five minutes; watermelon, more than forty-two days; cantaloupe, more than fourteen days; peach, twenty-four hours; apricot, forty-eight hours.

There was one difficulty I had to contend with in the case of the strawberry, viz, the molds. When it is remembered that the rough surface of this fruit offers many places for the lodgment of bacteria and molds, one is not surprised to see his specimen covered with mold within twenty-four hours. How to overcome this was a perplexing problem. I resorted to the following procedure: I made a saturated alcoholic solution of the bichloride of mercury and dipped the strawberry into it. I then allowed the fruit to dry, and then sliced away one side of the berry with a sterilized knife, and then made a section of the upper part of the fruit. By this means I was able to keep the fruit sterile for days.

Another difficulty, which I could not overcome, was the persistency with which the cantaloupe disintegrated. The surface of the watermelon seemed to be an admirable culture medium for the cholera spirillum. The pineapple seems to contain some inherent substance which is inhibitory to the growth of the cholera spirillum.

A very interesting fact was brought out in relation to the sour and the sweet oranges and the lemon. The cholera spirillum lived for five minutes in contact with the cut surface of a sour orange, and for thirty minutes in contact with the cut surface of a sweet orange, while in contact with the cut surface of the lemon it lived for less than five minutes. The culture medium used for growing the cholera spirillum in and for making the inoculations into was Dunham's solution, a simple alkaline solution of peptone. This is by far the best culture medium for the cholera spirillum that I have ever tried.

I wish to record a very curious phenomenon concerning the staining of this cholera spirillum in this series of experiments. I always used the Zeihl carbol-fuchsin solution, as it is easy of manipulation and gives a vivid picture. I noticed in the distinctly acid fruits that toward the end of the experiment the spirilla would invariably stain in an interrupted or beaded manner. Long spirilla would look like long chains of beads. I can not more aptly illustrate this than by comparing it to the interrupted staining of the bacillus diphtheriæ by Lœffler's method. As the spirilla became more and more unable to resist the fruit acid this interrupted staining became more and more apparent. Often I would make an inoculation into gelatin from one of these attenuated or weakened growths, and invariably within twenty-four or forty-eight hours I would get a growth of large, rounded, vigorous-looking comma forms. They would look as if they had been treated to a good, appetizing meal after being nearly starved on the acid fruit.

This rejuvenating of the cholera spirillum could always be done by transferring it to a gelatin culture medium. None of my inoculations became contaminated in this series of experiments; neither did any of the control inoculations show any contaminations of the cut surface of the fruits.

What practical lessons can be drawn from these experiments? The following seems to me to have been proven:

1. That the sterile cut surfaces of most of our fruits are inhibitory to the growth of the cholera spirillum, some of them destroying it rapidly, others taking a longer time.
2. That it is a dangerous practice to sprinkle or wash the cut surfaces of our fruits with water infected with the cholera spirillum.
3. That fruits in themselves do not contain or by growth spontaneously originate the cholera spirillum.
4. That some fruits, notably the watermelon and cantaloupe, offer a splendid culture soil for the cholera spirillum.
5. That in cholera-infected places oranges and lemons are the safest fruits to use, they acting almost as prophylactics.
6. That a strongly acid lemonade would be the safest drink to use in order to guard against the cholera spirillum.
7. Never use a fruit in a cholera-infected country unless you yourself see it cut with a sterilized knife and know that the surface of the fruit is free from the cholera spirillum.
8. That the very common practice, especially in tenement-house districts, of exposing for sale sections of fruits such as watermelon, oranges, cocoanuts, pineapples, etc., floating in water, should be strictly prohibited in all countries where there are any cases of cholera.

REPORT OF THE MEETING OF THE ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES.

By Thomas C. Craig, *Passed Assistant Surgeon, United States Navy.*

In compliance with the Department's order of the 1st instant, designating me as a delegate to represent the Navy Department at the annual meeting of the Association of Military Surgeons of the United States, in Philadelphia, Pa., and to report on the transactions of the association, and on any other medical or surgical matters coming under my notice, I have the honor to submit the following:

The association continued in session three days (May 12, 13, and 14), with a morning and afternoon session on each of those days.

The following is a complete list of the papers presented and read either in whole or in part or by titles:

1. The Emergency Ration, by Capt. C. E. Woodruff, assistant surgeon, United States Army.
2. Experiments with Emergency Rations, by Capt. L. A. LaGarde, assistant surgeon, United States Army.
3. Tetanus Resulting from Powder Burns, by Capt. L. A. LaGarde, assistant surgeon, United States Army.
4. The Effects of Cannon Firing and Explosion on the Ear, by Dr. Samuel Sexton, New York City.

5. Instruction of the Hospital Corps, United States Army, by Col. C. H. Alden, assistant surgeon-general, United States Army.
6. The Better Type of Medical Officers, by Lieut. Col. A. A. Woodhull, deputy surgeon-general, United States Army.
7. A New Bullet Forceps, by Col. N. Senn, surgeon-general, Illinois National Guard.
8. The Annual Encampment and what It Teaches the Surgeon of the National Guard, by Capt. J. J. Erwin, assistant surgeon, Ohio National Guard.
9. The Physiology of Bathing and Swimming, by Surg. H. G. Beyer, United States Navy.
10. Baths, Bathing, and Swimming for Soldiers, by Lieut. H. L. Chase, assistant surgeon, Massachusetts Volunteer Militia.
11. A General Consideration of Athletics: Their Value in the Training of Soldiers by W. A Brooks, jr., assistant surgeon, Massachusetts Volunteer Militia.
12. The Viability of the Cholera Spirillum in its Relation to Certain Fruit Acids, by P. A. Surg. T. C. Craig, United States Navy.
13. Is There a Necessity for Differences between the Standards of Physical Efficiency in the Regular Army and the National Guards? by Lieut. Col. R. Charles Greenleaf, deputy surgeon-general, United States Army.
14. What is the Most Practicable Plan of Sanitary Organization for the United States Army? by Maj. J. Van R. Hoff, surgeon, United States Army.
15. The Effects of the New Gun in Field Service, by Gen. J. D. Griffith, National Guard of Missouri.
16. Notes and Comments on the French Field Sanitary Service and What We May Learn from It, by Maj. Valery Havard, surgeon, United States Army.
17. Modern Methods of Sewage Disposal as Applicable to Military Posts, by Maj. A. C. Girard, surgeon, United States Army.
18. The Illustrated Travois, by Maj. W. C. Shannon, surgeon, United States Army.
19. Some Thoughts on Wheeled Vehicles for the Transport of Wounded, by Maj. George W. Adair, surgeon, United States Army.
20. What Standard of Visual Acuity should be Required of the Enlisted Men of Our Military Service? by Capt. J. M. Banister, assistant surgeon, United States Army.
21. Methods of Caring for Wounded in Field and Hospital of the Chinese and Japanese Armies, by C. U. Gravatt, surgeon, United States Navy.
22. Synopsis of a Report on the Medico-Military Arrangements of the Japanese Army in the Field, 1894 and 1895, made to the director-general, British army medical department by Surg. Col. W. Taylor, army medical staff. Presented by Col. Dallas Bache, assistant surgeon-general, United States Army.
23. Problems in Medical Administration, with Solutions, accompanied by Suggestions as to the Application of this Method to the Instruction of the Medical Officers of the National Guard. Presented by Col. Dallas Bache, assistant surgeon-general, United States Army.
24. The Epidemiological Features of the Late Epidemic of Plague in China and Cholera in Japan, by P. A. Surg. W. F. Arnold, United States Navy.
25. Recent Advance in Anthropology Applied to the Physical Examination of Recruits, by Maj. P. F. Harvey, surgeon, United States Army.
26. Outlines of the Sanitary Organization of the Army of Denmark, by Maj. John Van Rensselaer Hoff, surgeon, United States Army.
27. Cooperation in Public Sanitation, by Surg. J. C. Wise, United States Navy.
28. Modern Methods of Anthropometric Identification, so far as the United States Soldier is Concerned, by Maj. Paul R. Brown, United States Army.
29. The Use of Kola for Military Purposes by Practical Experience, by Col. G. H. Penrose, surgeon-general, United States Army.
30. A Plea for Earlier and More Permanent Treatment of the Wounded on or near the Battlefield, by Col. W. H. Forwood, deputy surgeon-general, United States Army.
31. Methods of Instruction in First Aid, by Capt. J. E. Pilcher, assistant surgeon, United States Army.
32. The Medical and Surgical Equipment of a Fifteenth Century Military Expedition, by Lieut. H. R. Stiles, assistant surgeon, United States Army.
33. The Treatment of Sick and Injured Civilians at the Summer Camps, by Lieut H. A. Arnold, assistant surgeon, National Guard of Pennsylvania.
34. A New Apparatus for Maintaining Apposition of Bones after Resection or in Fractures with a Tendency to Displacement, by Col. C. Parkhill, surgeon-general, Colorado.
35. Medical Department of National Guard of Pennsylvania, by Maj. Edward Martin, surgeon Third Regiment, National Guard of Pennsylvania.
36. Asbestus Surgical Field Dressings, by Capt. D. M. Appel, assistant surgeon, United States Army.
37. Notes by a Medical Officer in the East, by Charles C. Foster, surgeon, Massachusetts Volunteer Militia.

The more important papers read and discussed were:

1. "Instruction of the hospital corps, United States Army," by Col. C. H. Alden, assistant surgeon-general, United States Army. The writer gave a complete description of the instruction of the hospital corps of the United States Army and of the hospital corps of the National Guards of the different States. He paid particular attention to describing the minutiæ and organization of the different corps, and the necessity for thorough and practical training of the corps, both as a unit and as a whole. Colonel Alden laid particular stress on the importance of thorough discipline and thorough instruction in all the minor details which in time of actual warfare the subordinates would be called on to do.

2. "Baths, bathing, and swimming for soldiers," by Lieut. H. L. Chase, assistant surgeon, Massachusetts Volunteer Militia. This was one of the most complete and best prepared papers presented. The author reviewed and gave the regulations and descriptions of this most important subject as it is applied and carried out by all the armies of the world. Particular stress was laid on the teaching of all soldiers to swim and to encourage bathing. Suitable and attractive places for bathing and swimming should be of prime importance. Armies in which these things are carried out were shown to have more endurance, better health, more comfort, and better discipline than in those in which these things are neglected. The facilities for bathing and for learning to swim at our own military schools, viz, West Point and Annapolis, were contrasted with by far the most favorable comment on the system and arrangement which is in operation at West Point. The teaching of the soldier to swim with his clothes on and to carry with him the most important of his accouterments, as is done in the German army, was very graphically described, and the necessity for this was shown by illustrative cases. In my opinion this latter should form a part of the instruction of our sailors, for there may be many occasions on which this might be a very important duty.

3. "A new bullet forceps," by Col. N. Senn, surgeon-general, Illinois. Colonel Senn presented to the association a new bullet forceps, briefly remarking that the recent introduction of the new jacketed bullet rendered the old forceps useless, and if used would fail to grip it, owing to the hard smooth surface of the projectile. The author exhibited the new forceps he had designed, and illustrated its use with the new bullet. Its features consist in (1) its use as a probe, and (2) a small sharp tooth in each jaw of the forceps by which it is made to bite into the missile.

4. "Methods of caring for wounded in field and hospital of the Chinese and Japanese armies" by Surg. C. U. Gravatt, United States Navy. Great interest was shown during the reading of this paper. The author described the organization and equipment of the hospital corps of the Japanese army, its work in the field, the portable hospitals, and the hospital ships. It is no doubt owing largely to the work of this corps that the mortality was so low during their recent war.

5. "Some thoughts on wheeled vehicles for the transportation of wounded," by Maj. George W. Adair, surgeon, United States Army. Surgeon Adair doubted if there would be enough ambulances accompanying an army in the future to care for the transportation of the wounded; therefore he suggested that litters should be constructed with springs attached to them, so that they could be used on any vehicle.

6. "Modern methods of anthropometric identification so far as the United States soldier is concerned," by Maj. Paul R. Brown, surgeon, United States Army. This paper was, to me, by far the most interesting and instructive one read. Surgeon Brown called attention to the difficulties attending our present means of identification by what we call descriptive lists. He spoke of the difficulties of detecting deserters, fraudulent claimants for pensions, etc. The system which he advocated is a modification of the "Bertillon" method. This method is founded on (1) the measurement of certain bony lengths, (2) a systematic analysis of the features of the face, and (3) the exact location and description of certain permanent marks and scars. After puberty there are certain distances between bony points which change little or none; for example, length of forearm, length of middle finger, length of foot, length of ear, length of head, and also the following: Contour of nose, color of eyes. This paper called forth the most lively discussion. It was argued by many that the system was not applicable to any except the criminal class, and that it could never be adopted in the military services. The very strongest arguments, to my mind, for the adoption of this system in the military and naval services are its simplicity and the certainty with which a person can be identified. According to this system the person to be identified is entirely passive, merely certain measurements being required. In certain cases of loss of parts of the body or the disfigurement by burns, or a partly decomposed body, often render it impossible of identification by our present system. With the "Bertillon" method all this is obviated and identification is sure. I can not too highly recommend this system for adoption in our own service, as I feel sure that it will serve as a most efficient means of identification under any and all circumstances. The following is the system of measurements and other data:

No. ——.] *IDENTIFICATION CARD.*

Name ——
Age ——
Date enlistment ——
Nativity ——
Occupation ——
Place enlistment ——

ANTHROPOMETRIC DATA.

Height ——
Stretch ——
Trunk ——
Left middle finger ——
Left foot length ——
Left little finger ——
Left cubit ——
Head length ——
Head breadth ——
Right ear length ——
Right ear breadth ——

DESCRIPTIVE DATA.

Color eyes: Class ——
Nose bridge ——
Nose base ——
Color hair ——
Color beard ——
Inclination forehead ——
Inclination chin ——

Sanguineous coloration complexion ——
Pigmentary coloration complexion ——
Race: Caucasian. Semitic. Negro. North American Indian.
Station —— | Date ——
—— Surgeon.

DESCRIPTION AND LOCATION.

Cicatrices, peculiar marks, deformities, etc.

I ____________________

II ____________________

III ____________________

IV ____________________

V ____________________

VI ____________________

7. "Methods of instruction in first aid," by Capt. J. E. Pilcher, assistant surgeon, United States Army. The writer gave a concise and detailed description of the methods of instruction of the Army Hospital Corps in first aid. The enlisted men in the corps are daily taught the rudiments of anatomy, physiology, and surgery, together with bandaging, the application of dressings, the transportation of the sick and wounded, stretcher drill, and are encouraged to improvise dressings. These instructions are given by lectures and practical application of the different dressings. In many of the papers read I could see that the medical officers, both of the Army and National Guard, are extremely careful in this instruction of the men composing the Hospital Corps. If our service had a hospital corps and it was well disciplined and trained in the methods of first aid to the injured, I am positive that it would result in a much higher efficiency and benefit to our own sick and disabled than the few untrained and untried persons we now have. No more important addition could possibly be made to our service than a well-equipped and fully trained hospital corps, under the personal direction and control of the Surgeon-General of the Navy, the same as now is done in our Army.

8. "Asbestus surgical field dressings," by Capt. D. M. Appel, assistant surgeon, United States Army. Captain Appel exhibited some new surgical dressings made from pure asbestus. They consisted of bandages, gauze, wool, pads, lamp wick, tape, etc. They are soft, pliable, and absorbent, are easily sterilized by means of subjecting them to a flame, and in case of necessity can be used over and over again. I can not imagine a more useful addition to the outfit of the medical officer than these asbestus dressings, the more especially aboard ship, where space is a great consideration, and in places where the climatic conditions are such as to cause deterioration of the usual dressings. Often a vessel is away in some distant place where surgical dressings can not be procured or where it is impossible to sterilize them. Under these conditions the asbestus dressings would be an ideal thing.

At a clinic given to the members of the association at the hospital of the University of Pennsylvania by Prof. J. William White the use of the "Roentgen rays," as applied to surgery, was shown by numerous "skiograph" negatives thrown on a screen by the oxyhydrogen lantern. Needles, bullets, broken bones, dislocated joints, and ununited fractures were shown. With this the latest photographic achievement the progress of repair of bones can be ascertained without removing the dressings, photographing through splints and dressings. Every one of our hospitals, stations, and ships should be provided with an outfit capable of producing this useful information. The ordinary electric-light current used aboard ship furnishes ample power. I have made inquiry as to the cost of the "Crookes tube" and coil, together with the interrupter, to produce the alternating current, and I am told that it would be about $100 or $200.

These things could be assembled and issued by the electrical department of our own navy-yards, as recently the electrician at this yard has gotten up and used with great success a simple apparatus which has shown a needle, piece of steel, and other foreign bodies deep down in the tissues of the human being.

The modern treatment of fracture of the patella by means of wiring the fragments was admirably illustrated by an operation at the Jefferson Medical College by Col. N. Senn. The bone was laid bare, the ends sawn off, and stout silver wire sutures inserted, drawing the two fragments together. The wound was then hermetically closed. The operator said that with strict antisepsis and proper technique the operation was attended with success.

This the sixth annual convention of this association was an extremely instructive and successful one.

REPORT OF THE MEETING OF THE AMERICAN MEDICAL ASSOCIATION.

By J. S. HOPE, *Passed Assistant Surgeon, United States Navy.*

In obedience to the Department's order of April 22, 1896, I attended the meeting of the American Medical Association, held in Atlanta, Ga., May 5 to 8, inclusive, and have to report as follows:

The general sessions of the association were held daily at 10 a. m. The various sections met twice daily, the forenoon sessions being held at 10 o'clock and the afternoon sessions at 3. The places of meeting of the sections were various, and one could only attend the general session in the forenoon and one section in the afternoon. The work of the association was divided among 11 sections, and the total number of papers read in these sections was as follows:

Section on practice of medicine	34
Section on surgery and anatomy	40
Section on obstetrics and diseases of women	25
Section on ophthalmology	56
Section on laryngology and otology	25
Section on diseases of children	36
Section on materia medica, pharmacy, and therapeutics	14
Section on neurology and jurisprudence	51
Section on dermatology and syphilography	25
Section on State medicine	51
Section on dental and oral surgery	14
Total	371

A very decided majority of these papers were read by title only. I attended the sessions of the sections on State medicine, practice, and surgery in the afternoons and the general sessions of the association in the forenoons. In the entire course of the proceedings of the association I heard no papers read which had any special interest for surgeons in the Navy as a military branch of the service. The general addresses were powerful efforts of three of this country's ablest men. I shall append a résumé of Osler's address on practice and Senn's address on surgery and a full report of Rohé's address on State medicine.

In the section on practice of medicine the subject under discussion during my attendance was typhoid fever. There were reports from a conservative standpoint, reporting some fairly favorable results, but drawing no final conclusions, after the use of the Woodbridge plan of treatment. A number of delegates spoke enthusiastically of the treatment, but many of these admitted that they had not followed out the plan of treatment in detail. Osler criticised the treatment of typhoid by the use of intestinal antiseptics, and gave as his opinion that this method of treatment was as harmless as it was useless. He is a believer in Brand's method of treating this disease.

A paper read by Dr. Bishop, of New York, on "The care of cardiac disease during the quiescent period," showed the great change of public and professional opinion as to the grave prognosis of this disease:

> A great change of public and professional opinion as to the grave prognosis which was formerly given in valvular disease has occurred during the present century. The old feeling was that a person with chronic heart disease was certain to die in a moderate length of time, and was in constant danger of sudden death. The more careful physical examination of modern times has modified this view to a great extent, but credit must also be given to the better care of such cases. Sudden death is uncommon except in aortic insufficiency and in cases complicated by true angina pectoris. It may be that sudden death was more common at a period in medical history when the use of digitalis was habitually abused.
>
> The care of cardiac disease during the quiescent period is the care of the myocardium. For the endocardium we can do but little.

In treating these cases he referred to the beneficent results of proper exercise, massage, and baths:

> To my mind it is best to tell the patient of the existence of the condition * * * and to supply him with a sufficient amount of knowledge to make the explanation comprehensive and free from terror, because his cooperation is necessary in carrying out the proper regimen.
>
> Physical labor, if not such as causes sudden strains upon the heart's action, need not be interdicted, but all causes leading to undue excitement, or such as tend to a neurasthenic condition, must be especially avoided. A person with organic cardiac disease can often perform very hard mental or even physical labor, provided it is unaccompanied by excitement or worry.
>
> In the drug treatment of these chronic cases the use of iron is of great value. The tendency to anæmia, which exists in all chronic diseases, has in this instance a very direct tendency to exaggerate the symptoms. Sometimes dyspnœa is entirely relieved when the impoverished blood is brought up more nearly to par. The alimentary system must receive very careful attention. The tendency to passive congestion to produce damage is very much increased by any functional derangement. Constipation is a very great evil in these cases, and regularity of this function should be absolutely insisted upon. The means must be chosen according to the merits of each case.
>
> The use of drugs during the quiescent period must to a large extent be the drugs which we are pleased to call "hygienic" drugs, namely, tonics, laxatives, and occasionally alteratives. Strychnine is at times indicated in nearly all of these cases. It stimulates the nervous system in every part of the body, and in that way effects favorably the functions of nutrition, motion, and secretion. Digitalis may be used at times when the circulation seems to overburden the heart and when for any reason the better remedy, rest, can not be applied. In chronic heart disease, in individuals with specific taint, occasionally brilliant results have been obtained by specific treatment, the heart tone being apparently much improved under the course of medication.
>
> The occasional use of mercurial purges in patients with chronic cardiac disease, who habitually overeat, is very important. The use of alcohol in chronic heart disease is often baneful in its effect and it is extremely difficult for the patient to break the habit. In the ordinary drunkard it is really the heart that cries out for alcohol when an attempt is made to stop its use, though the effects of the depressed heart are referred to the stomach, brain, and general circulation.

In the section on surgery a paper was read by Dr. Fergusson, of Chicago, on "Thoracoplasty in America (Schede's), and visceral pleurectomy" for otherwise hopeless cases of chronic empyema, with report of cases.

The writer said that some cases were not cured in spite of operation. He is of the opinion that Schede is not entirely correct in his opinion that amyloid degeneration and tuberculosis do not contraindicate the operation.

Five cases were reported. In four of these perfect recovery had been the result after Schede's operation. It was the opinion of those who discussed the paper that this operation should not be done until

Estlander's had failed, and that the heroic operation of pleurectomy should not be thought of until Schede's had been done.

Dr. Beach, of Boston, read a paper on "Exploration and treatment of fissures from skull fractures." The author said, in the course of his paper, that a share of the results is, without question, from severity of injury as well as from complications which are dependents of sepsis. As possibilities of infection can not be estimated before the development of unfavorable symptoms—when too late to institute antiseptic measures, however radical—conservative treatment should include at first the inspection of the wound, a most rigid asepsis, the exploration of the fissure with the utmost precision (uncovering the whole circumference of the skull for that purpose), and providing unlimited drainage by widening the fissure into loosely connected bone. In infected wounds, in searching for the source of infection, when the infective products were not introduced through a fissure of the vault or base, the occasional association of serous and bloody discharges from the nasal and auditory passages suggests the possibilities of bacterial infection from these sources by the extension of a portion of the fissure to the internal ear.

In all cases of fractures involving the ears a competent primary asepsis of these and the nasal cavities was emphasized because of the danger associated with such a fracture of carrying septic matter into the cranial cavity. Stress was laid upon the fact that nearly 50 per cent of all brain abscesses originated from suppurative ear disease.

In the section on meteria medica, pharmacy, and therapeutics, under the title "Discussion of the United States Pharmacopœia," a paper prepared by Charles Rice, one of the committee for the revision, said, concerning the introduction of doses and some of the newer synthetic remedies into the next Pharmacopœia:

> In 1890 the position which some of these remedies occupied (referring to the coal-tar products) was already so important that strong pleas were presented to the Pharmacopœial Convention in favor of their official recognition, but the spirit of conservatism and a sense of reluctance to put the stamp of approval upon articles which were protected by patents, trade-marks, or other proprietary rights induced the convention to instruct the committee of revision to refuse them admittance. Since that time the number of these articles has constantly increased and will still further increase as the century approaches an end. Surely, if the large majority of medical practitioners of this country does not see fit to object to prescribing such drugs as phenacetin, antipyrin, sulfonal, etc., are we not justified in considering the supposed ethical boundary as broken? These articles stand on a basis entirely different from that which is occupied by the ordinary proprietary nostrums, the composition of which and the mode of preparation of which are kept secret. The synthetical remedies have not even the shadow of secrecy about them. Their exact composition and physical properties, their mode of preparation, reactions, etc., are thoroughly known and controllable by tests or assay.
>
> Foreign pharmacopœias have recognized and admitted a number of these synthetic products. Had the revisers of the present Pharmacopœia known in time that salol was one of these very articles, the manufacture and name of which were protected by proprietary right, the article would certainly not have been admitted into the Pharmacopœia. It was only after the appearance of the work that the committee learned the facts relating to it. Since salol is now in the Pharmacopœia, it is safe to presume that it will remain there, even under its present copyrighted name; and if salol is to remain, why not take this as a precedent and introduce such other synthetic remedies as shall be found to have survived ephemeral fame and really merit recognition?

The writer suggested two themes as worthy of consideration and concerning which it is desirable to obtain the sense of the medical profession:

1. It is proposed that the next committee of revision shall be authorized to state the average doses in connection with each drug or preparation used internally. The doses shall be designated by a subcommittee

consisting of those members who are practitioners of medicine, and shall be given in such form as will leave full liberty to the prescriber to exceed the limit given.

2. It is proposed that the next committee of revision be authorized to introduce into the Pharmacopœia any compound or preparation whose composition, properties, and mode of manufacture are known, and whose identity, purity, and strength can be ascertained by tests, irrespective of any proprietary rights that may be connected therewith.

THE SECTION ON STATE MEDICINE.

I devoted most of my time to attendance upon this section, hoping to glean notes which might be of special interest to the medical corps of the Navy. I have to report that in this I was disappointed. The papers which I heard read were not germane to the duties of the sanitary officers of the naval branch of the service. On the official programme there were many papers whose titles indicated that they would have been of interest. None of these were read during my attendance. By courtesy I was permitted to make the following abstract of a paper on serum therapy in disease, prepared by Dr. George Tully Vaughan, passed assistant surgeon, United States Marine Hospital Service:

From the time of Jenner's discovery that the dried serum of cowpox prevented or modified smallpox when introduced into the human system has existed the hope that remedies would be discovered somewhat of the same character which would cure or prevent all diseases.

The day seems now at hand when, with a cure or preventive for every disease, cholera, yellow fever, diphtheria, leprosy, syphilis, and tuberculosis will be as rare as smallpox now is among those who are properly vaccinated. The ideal treatment of disease is to prevent it.

The fact that certain animals are immune from certain diseases, e. g., that the lower animals do not have syphilis, has long since excited curiosity as to the reason, but nothing satisfactory was offered until the bacteriologists had established the existence of toxins and antitoxins, and immunity can be induced or acquired by the proper use of the specific entity, its products or effects, which causes the disease.

The theory of natural immunity now most in favor is that the blood serum contains in solution a germicidal proteid, alexin, or nuclein, whose source is the leucocytes, soluble only in an alkaline fluid, and that phagocytosis (the phenomenon discovered by Sternberg and developed by Metschnikoff) plays a subsidiary part.

Generally speaking, the nucleins are insoluble in dilute acids and soluble in dilute alkalies. They resist peptic digestion and in this way may be separated from most other proteid bodies. According to Buchner, natural immunity cannot, as a rule, be transmitted to the body of another animal by means of the blood. Acquired or artificial immunity is of the greatest importance, as it affords the physician the means of preventing disease. To Pasteur belongs the credit of having taken up the thread where Jenner left off, and he was the second to show by his experiments on chicken cholera in 1888 that infectious diseases may be prevented by inoculation with attenuated virus. Immunity may be acquired:

1. By having the disease; one attack of certain dieases, as yellow fever, smallpox, measles, scarlet fever, etc., usually assuring future immunity. Of course this may be induced by inoculation with the microorganism of any particular disease.
2. By inoculation with attenuated cultures.
3. By inoculation with filtered cultures which are free from bacteria, or with sterile cultures which contain dead bacilli. Filtered cultures contain the toxins, while sterile cultures contain in addition some special property in the dead bacteria. The latter were used by Löffler and Abel in their experiments for immunizing against typhoid fever with the best results. This protective power afforded by one attack of a disease against other attacks of the same disease, or by inoculation with bacterial cultures, is generally supposed to be due to the existence of antitoxins and something else in the blood serum.

According to Buchner the action of antitoxins does not depend on destruction of bacterial poisons by contact with them, but upon their action through the medium of the tissues of the body. The presence of the antitoxins produces a lower degree of susceptibility to the toxins of the bacteria in the living cells of the body, thereby rendering it more resistant to the action of the specific toxin.

Failing to prevent disease, the next best thing is to cure it, and the successful use of blood serum in accomplishing this result seems first to have been made by the Japanese bacteriologists Ogata and Jasuhara, although their experiments failed of confirmation by others, when, in 1890, they announced that mice which had received a small amount of dog's, rat's, or frog's blood (animals immune to anthrax) two or three days before or a few hours (five) after the injection of anthrax bacilli all recovered from otherwise fatal doses of anthrax bacilli and proved afterwards to be immune.

Blood serum has been used in the treatment of the following diseases with more or less success: Diphtheria, cholera, tuberculosis, leprosy, syphilis, tetanus, typhoid fever, pneumonia, and others. Beyond question its greatest triumph and most convincing effect for good has been obtained in the treatment of diphtheria.

Syphilis has been treated with the blood serum of one who has just passed through an attack of the disease by Dr. Edward Cotterell, of England, in 18 cases extending over a period of six months with the following results:

1. In the early stages, with only a sore and glandular enlargement, injections of this serum caused the sore to heal rapidly. The adenitis in the groin became intensely marked, while the skin and throat symptoms were absent or slightly marked.
2. When the treatment was not begun the rash and throat symptoms had developed, the skin eruption faded more rapidly than under mercurial treatment, but the throat symptoms disappeared rather slowly.
3. The general health improved.
4. Serum from a person with secondary symptoms appeared to be more active than that obtained from one with tertiary symptoms.
5. Dose of the serum from one-half to 5 cubic centimeters.

During the course of the general sessions resolutions were passed to the effect that if the English language be not recognized at the Moscow convention of 1897 the American Medical Association will decline to send delegates.

Another resolution requesting Congress to make the metric system of weights and measures the legal system for the United States was unanimously adopted.

The action of the Navy Department in granting a site for the Rush monument was applauded.

The centennial celebration of the discovery of vaccine virus by Dr. Jenner was an interesting occasion. Papers were prepared by Dr. N. S. Davis on "The life and researches of Jenner;" by the Surgeon-General of the United States Army on "Scientific researches relating to the specific infectious agent of smallpox and the production of artificial immunity from this disease;" by Dr. Martin, of Boston, on "The propagation, preservation, and use of the vaccine virus," and by Dr. Foster, of Georgia, on "Statistical evidence of the value of vaccination to the human race."

I append a summary of the conclusions reached and suggestions made by Dr. Sternberg, Surgeon-General of the United States Army.

The experimental evidence relating to the nature of the specific infectious agent of vaccine and of variola is reviewed, also that relating to the genetic relation of cowpox, horsepox, and smallpox; also that relating to the production of artificial immunity by subcutaneous inoculations with vaccine lymph, and by subcutaneous or intravenous injections of blood serum from immune animals.

The following conclusions are stated:

1. Smallpox, cowpox, and horsepox are genetically related, being different manifestations of the same infectious disease in different genera of animals (Homo, Bos, Equus).
2. The specific infectious agent of variola and of vaccine has not been demonstrated. The extended experimental investigations which have been made indicate that it does not belong to the class of microorganisms known as bacteria.
3. Various bacteria are commonly found in lymph from vaccine vesicles, obtained either from bovine animals or from man. Among these are the well-known pus

cocci, and these micrococci are probably largely responsible for the erysipelatous inflammation and other unpleasant complications which frequently result from vaccination with such lymph.

4. Lymph preserved in glycerin after a time becomes sterile so far as the presence of bacteria is concerned without losing its specific virulence.

5. Immunity may be induced by subcutaneous inoculation of vaccine virus without the development of a vaccine vesicle, and it is probable that the subcutaneous injection of lymph preserved in glycerin would give protection without any of the septic complications so common as a result of vaccination by the usual method.

6. The blood serum of immune animals contains a substance in solution which destroys the specific virulence of vaccine virus when brought in contact with it.

7. This substance is not present in sufficient amount to make the blood serum of immune animals available for the production of immunity in man (or for the treatment of variola?). But it may perhaps be obtained in a concentrated form by chemical methods, and in that case would be likely to prove useful, and possibly specific, as a therapeutic agent in this disease.

8. The immunity resulting from the subcutaneous injection of vaccine lymph, like that resulting from vaccination in the usual manner, is gradually developed, and is not complete until the eighth day, depending, no doubt, upon a multiplication of the infectious agent in the body of the susceptible animal. On the other hand, the immunity resulting from the transfusion of a large amount of blood serum from an immune animal to a susceptible animal is an immediate result of such transfusion.

Dr. William Osler's address on "The study of fevers of the South" contained the following:

Humanity has but three great enemies—fever, famine, and war—of which by far the greatest, by far the most terrible, is fever.

It is worthy of comment that three of the greatest benefits conferred on mankind, beside which it would be hard to name three of equal importance, have been in connection with the fevers, the introduction of cinchona, the discovery of vaccination, and the announcement of the principle of asepsis. The differentiation of special forms of the continued fevers, and particularly that of typhoid, forms one of the most interesting chapters in medicine.

He discussed in a brief manner the way in which the continued fevers had been differentiated during the present century, and paid a tribute to the part which had been played in this work by the American students of Louis, the great French physician.

It is a very gratifying sign to notice the attention which has been given of late to the subject of typhoid fever in the South.

Some years ago a good many physicians resented the imputation that the disease, to any extent, prevailed in the Gulf States.

Enteric fever presents no constant picture. On the contrary, scarcely any disease has a more varied symptomatology. The fever may be said to be invariable, though afebrile cases are not unknown, but in the features of onset, in the length of its course, in the presence or absence of symptoms regarded as cardinal, such as rose spots, diarrhea, and splenic enlargement, typhoid fever is so uncertain that the diagnosis is often dubious.

Advances in the treatment of fevers, and especially of typhoid, have not kept pace with the rapid progress in our knowledge of the etiology. Think of the misery, the tediousness, the discomfort of a typhoid case with three relapses; think of the bleeding, the blistering, the purging from which at least our fever patients of to-day are free. Contrast with the former methods the care, the gentle nursing, the scrupulous cleanliness, the abundance of cold water to drink, and fresh air which typhoid fever patients of to-day receive. I would claim the privilege of a faddist to abuse roundly other faddists who did not swim in my puddle.

As a strong advocate of hydrotherapy I take especial pleasure in denouncing as heretics of the worst possible stamp the advocates of the so-called antiseptic and abortive methods of treatment of typhoid fever. I would place a man who does not also give a purge in a limbo just a little less hot, as he probably does a little less harm. Scarcely a week passes in which I do not receive a temperature chart of some case of typhoid fever which has terminated spontaneously on the twelfth or fourteenth day as a triumphant demonstration of the value of drugs, which, from my point of view, might as well have been given per cutem in the tub.

The advocates of this country for the abortive and antiseptic plan of treatment must bring forward a much stronger body of evidence than has been presented before they can hope to carry conviction to the skeptical. To claim an abortive treatment of typhoid in a case in which on the thirteenth day of the illness and on the seventh of the treatment a patient died of intussusception as "cured of his typhoid fever on the seventh day of treatment," when the autopsy showed "the characteristic and extensive ulceration of Peyer's patches and tumefied mesenteric glands," is to talk a language unintelligible to an educated medical man and is nothing short of midsummer madness.

Full clinical histories should be furnished of typhoid fever cases, and anyone who wishes to contribute to the subject should not be too busy, not only to make a careful, critical study of the symptoms, but to jot them down in some order, so that at least they may be intelligible to others. The second point is the necessity of obtaining autopsies in fatal cases. We all appreciate how difficult this is in private practice, but in determining the nature of obscure atypical cases of fever it is absolutely essential. There is not a hospital in the country in which the determination of the nature of an obscure case of fever is not settled by the autopsy alone. Thirdly, it is essential that observers who undertake to study this question with thoroughness should approach it with a full acquaintance with the varieties of the malarial parasites and with an accurate knowledge of bacteriological technique. To us as a profession belongs the chief glory of the century. Enormous as has been the advancement in material prosperity and widespread as has been the diffusion of benefits from the development of the physical sciences, they can not compare with the progress which has been made in the relief of suffering and the prevention of disease. Our work here ranks among the most memorable achievements in the history of the race. Fever in its various forms is still with us, and the century has seen in connection with it but one discovery of the first magnitude, but it is of almost equal importance to know that the way has been opened and that the united efforts of many workers in many lands are day by day disarming this great enemy of the race.

ADDRESS ON SURGERY.

This was delivered by Dr. N. Senn, of Chicago. He selected for his subject, "Some of the limits of the art of surgery." He said modern surgery has attained a degree of development which entitles it to the distinction of a science and an art. As a science surgery is of recent date, having been founded and perfected during the last half of the present century. As an art it has been practiced for centuries by our ancestors, with credit to themselves and benefit to the injured, the crippled, and the sick. When Boyer wrote the introduction to his classic work on surgery he expressed the conviction that surgery had reached perfection. How little did he dream of the great changes that would be wrought in the practice of his cherished profession by the progressive pathologists and surgeons of the next few generations! What a contrast between the standing of the surgeon of to-day in the community, the profession, and from a scientific aspect as compared with his colleagues of only a century ago!

Modern pathology and the new science of bacteriology have laid a permanent foundation for the steady and progressive advance of surgical thought and work. The inflammatory complications of wounds and the etiology of most of the chronic infective surgical diseases have been cleared up by bacteriologic investigations during the last twenty-five years, and the knowledge thus gained has enabled the surgeon to prevent in a large measure the former and to treat intelligently and with increased success the latter. The wonderful development of operative surgery during the same time is one of the earliest and richest fruits reaped from the vast and fertile field sown and cultivated by bacteriologists of every civilized nation. Antiseptic and aseptic surgery have smoothed the rough and rugged pathway of the practical surgeon. The almost universal introduction of antiseptic and aseptic precautions in the treatment of wounds in private and hospital practice has nearly eradicated the three greatest enemies of the surgeon of old, namely, hospital gangrene, erysipelas, and secondary hemorrhage, and minimized the occurrence of suppuration and its manifold immediate and remote complications.

In considering special work Dr. Senn said that the furor operativus manifested in special departments of surgery and its obvious results render the standing and legitimate scope of the general surgeon very uncertain and indefinite at the present time. Let the general surgeon turn to the right or to the left, advance or retreat, and he finds himself on reserved territory. As for the physician, he is expected to answer night calls, prescribe for diarrhea and whooping cough, watch cases of typhoid fever, measles, scarlatina, and smallpox, and should complications arise and he does not report to the proper authority he renders himself liable to censure. Much of this ill-applied energy in the surgical world has resulted in detriment to patients and in retarding actual surgical progress. Operative surgery has been carried to extremes.

The speaker next passed on to the consideration of antisepsis and asepsis, saying that the marvelous reduction in the mortality following injuries and operations which the present generation has witnessed is largely due to the prevention of wound complications by the employment of efficient antiseptic and aseptic precautions.

Phlegmonous inflammation.—The employment of antiseptic and aseptic precautions in the treatment of intestinal and accidental wounds has greatly diminished the frequency of progressive phlegmonous inflammation and its often disastrous consequences. That such an occurrence can not always be prevented, even by the most scrupulous care and attention to details, every surgeon of experience is willing to admit. In the most virulent forms of phlegmonous inflammation the most heroic and timely treatment, local and general, is often fruitless in averting speedy death. In the most desperate cases the surface lesion is often insignificant. The infection, following the lymphatic pathways, soon reaches the general circulation, resulting in death from acute sepsis before any decided gross pathologic lesions have appeared at the seat of infection or in any of the internal organs. How rapidly general infections may take place has been shown by the experiments of Schimmelbusch, who found micro-organisms in the spleen five to ten minutes after infection of a wound. Colin and Niessen demonstrated by their experimental work that amputation a few minutes after inoculation of the ears and limbs of rabbits with pure cultures of anthrax did not protect the animals against generalization of the disease. Such cases in the human being fortunately are seldom met with, but when they do occur the art of surgery is powerless in arresting the progress of the disease. Parenchymatous injections of solutions of carbolic acid or corrosive sublimate along the course of the inflamed lymphatics and the internal use of alcohol in heroic doses promise the most, but in the great majority of cases the extension of the infection continues and terminates speedily in death from general sepsis. In the treatment of diffuse phlegmonous processes it is now customary to make free incisions, establish free drainage, and disinfect the cavity by flushing it freely with a safe and yet efficient antiseptic solution, such as a saturated solution of acetate of aluminum, a 3 per cent solution of carbolic acid, or a 1 to 5000 solution of corrosive sublimate, and apply to the part hot compresses wrung out of the same solution.

Closely allied to phlegmonous inflammations of the soft tissues is acute suppurative osteomyelitis, as it is caused by the same kinds of microbes and results in more or less extensive destruction of tissue. The etiology and pathology of this disease are now well understood, and upon them is based the early operative treatment which is generally indorsed by the profession at the present time. The early removal of the osteomyelitic product by operative interference as a rule relieves pain promptly, limits necrosis, guards against joint complications, and recognizes the danger from general sepsis. Immobilization of the affected limb in proper positions and the exposure of the osteomyelitic focus by the use of the chisel or gouge as soon as a positive diagnosis can be made are the modern resources which have succeeded in greatly reducing the mortality of this disease as well as its immediate complications and remote consequences.

In considering tuberculosis of joints Dr. Senn stated that only a few years ago the surgeons who paid special attention to diseases of the joints were enthusiastic advocates of early resection or arthrectomy in cases of tubercular joint affections. It was believed that such treatment would succeed in eliminating the local affection and in preventing the extension of it to distant organs by reinfection from the peripheral focus. Statistics prove that these hopes are unfounded, and conscientious surgeons have substituted largely in place of operative treatment conservative measures. A change in practice has taken place, largely due to the beneficial effects obtained from intraarticular and parenchymatous injections of iodoform-glycerin injections. Dr. Senn has resorted to this treatment in hundreds of cases with the most satisfactory results. In about one-half or two-thirds of all cases of uncomplicated joint tuberculosis this treatment proves curative. It is of special value in the treatment of tubercular abscess in communication with a tubercular joint or bone. From one to three or four injections usually suffice in obliterating the abscess cavity.

Coming to the subject of malignant tumors, he said the essential cause of carcinoma and sarcoma remains to be discovered. The science of surgery must first divulge the true nature of tumors before we can expect a decided advance in their more successful treatment. The essential features of the modern treatment of malignant tumors he summed up very briefly as follows: Operate early and thoroughly. The treatment of inoperable sarcoma by injections of the sterilized toxins of the streptococcus of erysipelas and the bacillus prodigiosus has not filled the expected results.

The surgery of the three great cavities next received attention, after which the surgery of the skull and brain was dealt with. In Dr. Senn's opinion operative interference is absolutely indicated in fractures of the cranial vault under the following circumstances: 1. All open fractures, including gunshot and punctured fractures. 2. Depressed fractures attended by well-defined symptoms caused either by the depression or intracranial complications. 3. Rupture of the middle meningeal artery with or without fracture of the skull.

The indiscriminate use of the chisel and the trephine in the hands of the inexperienced practitioner is fraught with danger, and should not be encouraged by teachers and expert surgeons. Cerebral localization and aseptic surgery have made it possible to treat a few intracranial lesions successfully by direct operative interference.

Surgery of the abdomen.—The abdominal cavity was largely a terra incognita to the surgeon of less than half a century ago. To-day it is the favorite battle ground of the average surgeon and the select field of the so-called abdominal surgeon. Notwithstanding the wonderful improvements in the technique of operations upon the stomach, partial gastrectomy and pylorectomy have yielded anything but encouraging results. In nearly 50 per cent the patients subjected to radical treatment for malignant disease of the stomach succumbed to the immediate effects of the operation. Dr. Senn has opened the abdominal cavity for the surgical treatment of malignant disease of the stomach 19 times, and only in one case did he find the disease limited to the organ first affected, and in this case the general health of the patient had been so much deteriorated by the obstructive pyloric carcinoma as to contraindicate a radical operation. In all of the remaining cases a pylorectomy or partial gastrectomy was out of the question, as the carcinoma of the pylorus or stomach had extended to adjacent organs or had given rise to regional infections through the lymphatic glands sufficiently to contraindicate any attempts at radical removal of the disease.

Dr. Senn next considered at length the organs of generation, saying that the greatest onslaught of modern surgery has been upon the organs of generation, male and female. The future historians who will record the work of many gynecologists belonging to the present generation will have reason to express their surprise at what disasters the art of surgery has produced when plied in cases far in advance of a scientific foundation. Here and there we hear a feeble voice protesting against the indiscriminate surgery upon the organs of generation of the opposite sex, but the mutilating work continues in spite of such opposition and well-meant advice. Dr. Senn said, when he arraigns the gynecologists before such a representative body, composed of representative medical men of this country, for innumerable and inexcusable transgressions of the rules which ought to govern and control the art of surgery, he does not include the scientific, conscientious workers in that department of surgery, but his remarks apply to a class of routine operators which has recently grown to alarming dimensions not only in this but in nearly every country which has been penetrated by the dim rays of so-called bold surgery. The new generation of doctors finds no longer satisfaction in practicing their profession in some rural district. They have their eyes on large cities and have heard of enticing fees paid to specialists for insignificant operations. Why buy a horse and saddlebags when a fortune awaits them in devoting themselves to a specialty, more particularly gynecology? The recent graduate or the man who has become disgusted with country practice seeks a much-employed gynecologist, follows his work for a month or two, and returns to his prospective field of labor a full-fledged specialist. He is now ready to extirpate the uterus, remove ovaries and Fallopian tubes, sew imaginary lacerations of the cervix and perineum. Do you suppose that such an aspirant for gynecological fame ever examines a woman and finds her perfect? Is it not true that in nine out of ten cases he finds something to mend? In order to show that the speaker's views were real and not visionary he related a few instances.

Laceration of the perineum is another subject of the amateur gynecologist. The extent of laceration and the symptoms caused by it are not always carefully considered in deciding upon the propriety of an operation. Dr. Senn said that to do an operation on the perineum in five or seven minutes still serves as an attraction for the lookers on in many private hospitals and gynecological clinics. He fully appreciates the value of a well-performed perineorrhaphy in proper cases, but he was equally well satisfied that the operation has often been performed unnecessarily, and that it requires more than five or seven minutes to perform it properly.

The frequency with which women are being castrated is one of the most flagrant transgressions of the limits of the art of surgery. It is not unusual for one operator to exhibit from five to six normal ovaries as the result of half a day's work. All kinds of excuses are made for this kind of surgery. Dr. Senn asked the question: "Where is this wholesale unsexing of our female population going to end?" The beginning of the end has come. The army of women minus their essential organs of generation is beginning to raise its voice against such mutilating work. The number of women who willingly sacrificed their ovaries to restore their shattered health without securing the expected relief has increased to an alarming extent. This sad experience has made the gynecologists more desperate and bold. It is difficult to say where this rage for the removal of the female sexual organs will end or what organ will be the next battle ground for the aggressive gynecologists. The clitoris, the vagina, the cervix uteri, the ovaries, the Fallopian tubes, and the uterus and its ligaments have successively passed through a trying ordeal of operative furor. What the next fad will be is impossible to foretell.

He could not dismiss the subject of genital surgery without making a strong plea in favor of conservatism in the treatment of prostatic hypertrophy. Reference was made to the experiments of J. W. White on animals in this connection; also the clinical experience of Ramm, whose results covered about the same ground as those of White, urging the utility of castration as a legitimate surgical procedure in the treatment of nonmalignant obstructive enlargements of the prostate. The reason the speaker alluded to this subject was, he feared that when this operation on aged men for hypertrophy of the prostate becomes common property, and is indorsed by surgeons of high standing, it would be misapplied in the same way, probably to a lesser extent than the removal of normal ovaries. Men will be castrated for stone in the bladder, chronic cystitis, and malignant disease of the bladder. It is not always easy or possible to make a positive differential diagnosis between simple hypertrophy of the prostate and some of the conditions which simulate it so closely. In doubtful cases it appears to him it would be advisable to make the diagnosis sure by a suprapubic cystotomy before resorting to a multilating operation, rather than remove the testicles and later discover a bladder or encysted stone or malignant disease of the bladder or prostate. Castration is such an easy operation that every tyro in surgery will be tempted to perform it upon willing subjects suffering from obscure affections of the bladder, complicating hypertrophy of the prostate gland. The Ramm-White operation deserves a fair trial at the hands of competent surgeons, in well-selected cases, but Dr. Senn apprehends evil in the future, not so much from the proper use as the abuse of this procedure.

Finally, he had written and delivered his address with malice toward none, in the interest of the suffering portion of our population, for the true advancement of the science and art of surgery, and as a plea for recognition of the good work done by the great mass and backbone of our profession, the modest, toiling, inadequately remunerated general practitioner.

From the address in State Medicine by Dr. George H. Rohé on "The purification of public water supplies" the following is taken:

> The most vitally important sanitary problem confronting American municipalities at the present day is, unquestionably, the supply of pure water for drinking and other domestic purposes. The widespread prevalence of typhoid fever may be practically looked upon as a measure of the pollution of the drinking water. Depending, as this disease does, almost entirely upon an infected water supply, the importance of having the latter of a pure quality is self-evident. In 1894, twenty-five of the principal cities in the United States had an average typhoid mortality of 39.6 per 100,000 of population. Those cities which had the largest mortality from the disease were supplied by a highly suspicious quality of drinking water. It will be hardly necessary at the present day to insist upon the etiological relation of infected

drinking water to typhoid fever. The numerous epidemics in this country and abroad which have been studied with so much care by eminent sanitarians, have demonstrated this relation. While cases doubtless occur in which the disease can not be traced to the water supply, these constitute the vanishing minority; the overwhelming majority being unquestionably due to infected water.

In epidemics of cholera a similar relation exists between the outbreaks and extension of the disease to an infected water supply. Aside, however, from the production of these specific diseases, pure water, or water free from all sorts of uncleanness, is demanded by the "sanitary conscience" of the public.

These premises being conceded, the great importance of securing a supply of drinking water free from contamination becomes manifest.

In sparsely settled districts, or where a supply of unpolluted water can be brought from a distance to a large community, it will probably be better to secure such a pure supply rather than purify a source of supply which has been polluted; but in the majority of instances, particularly in the eastern and central sections of this country, the procurement of such an unpolluted supply is practically barred by financial considerations. We are therefore reduced to one of two alternatives—either to limit as much as possible, or altogether prevent, which is practically impossible, the access of impurities (notably of sewage or excremental matter) to the sources of supply, or else to resort to some method of purification of the water after it has become polluted.

The city of New York has recently chosen the first alternative mentioned, by the purchase of ground immediately bordering upon the stream furnishing the drinking water to that great metropolis. By the removal of sources of pollution from the area of land so acquired, the endeavor has been made to secure a pure drinking water.

I have not at hand the figures showing the amount of money expended in order to accomplish this purpose, but the sum must have been extremely large. In Chicago, the extraordinary outbreak of typhoid fever from 1889 to 1893 led to the extension of the in-take pipes in Lake Michigan to a distance of 4 miles from the shore, and the consequent diminution of the sewage contamination has reduced the typhoid mortality from 159.7 per 100,000 in 1891 to 31.4 per 100,000 in 1894.

In most instances, however, where large communities are supplied with polluted water, the changing of the source of supply is impracticable. A recent inquiry by a commission of engineers upon providing a new supply of water for the city of Cincinnati has taken into consideration a scheme for drawing the supply from the Cumberland Mountains, a distance of 130 miles away. The estimated cost of this work was $27,000,000. Another scheme considered by the same commission was to draw the supply from Lake Erie, 250 miles distant, at an estimated cost of over $40,000,000. Chicago expended $3,500,000 for the construction of the tunnel into the lake at its very doors.

These figures will probably be sufficient to show the impracticability, from a financial standpoint, of abandoning a source of water supply that may be polluted, now in use by any community, and going a great distance in search of a pure water supply. Fortunately there is at our hand, however, a means by which a source of supply once polluted can be again rendered pure—this is filtration.

Formerly, filtration simply meant straining out from water all gross impurities, and changing a dirty or muddy water into a clear and limpid fluid. It did not contemplate the changing of organic compounds into inorganic compounds, or the removal from the water of minute organisms, which we have learned to regard as causes of specific diseases. Our notions of what constitutes purification of water have considerably changed. We now know that water may be perfectly clear and limpid, and yet be extremely impure by reason of its content of organic matter or dangerous microorganisms. The results obtained by the filtration of sewage, in which a highly impure liquid, full of organic matter and teeming with microorganisms of various kinds, is rendered clear, limpid, almost entirely free from organisms and of organic matter, have taught us how to purify a polluted water, which in many instances is simply a highly diluted sewage.

This method of speaking of a polluted water supply is not an exaggeration when we study the published reports of the analyses of the water formerly used by the city of Lawrence in Massachusetts, and now used by Jersey City and other larger and smaller communities in this county.

A great impetus to filtration was given by the experiments conducted under the auspices of the Massachusetts state board of health at Lawrence in that State, and carried out so thoroughly by Mr. Hiram F. Mills and Mr. Allen Hazen. These experiments, carried on with painstaking care for a number of years, prove conclusively that water, no matter how polluted, can be rendered pure by simply filtering the same through sand filters, provided certain cautions were observed regarding the construction of the filters, the rate of filtration, and other conditions varying with the character of the water to be purified.

For many years filtration through sand has been used by European municipalities to secure purification of water. In London most of the drinking water has been filtered for upward of forty years. The filter beds of Berlin cover an area of upward of 30 acres. In many of the continental cities the drinking water is subjected to filtration. The construction and practical management of filters have been investigated with great care. Comparative studies of the efficiency of sand filters, and of various processes of so-called "mechanical filtration," have been made recently in Providence, R. I., and at Lawrence, Mass. While the results obtained by different investigators have not been in entire agreement, the prevailing opinion of sanitarians and engineers is that sand filtration, where it can be adopted, gives the best results in purification, at the lowest cost of construction and maintenance.

Koch has given the following clear explanation of the process of sand filtration:

"The problem of filtration is to purify water from the matter held in suspension. Matter which has been dissolved goes through the filter with hardly any or with no perceptible change. As the chemical investigation of water has chiefly to deal with inquiry into the constituents which have been dissolved, it can not aid in studying the processes of filtration. But in earlier days one was so much accustomed to judge the character of water according to its chemical characteristics that, in complete ignorance of what took place in the process of filtration, one attempted to test and regulate the process chemically. Naturally no useful result ever came of this. The specialists in filtration had found this out even in early times and had attempted to obtain aid in some other way. They tested the water in glass or metal cylinders, the so-called 'water test,' as to its transparency before and after filtration, and according to the result they judged of the value of the sand filters. By this simple means they succeeded in discovering the most important conditions for a sufficient purification of water from its suspended constituents.

"From this it appears that the real filtration does not take place in the sand, but that, by deposit from the still unpurified water, a layer of mud is formed on the top of the sand, and that this layer of mud which is over the sand is the real filter which retains the suspended constituents from the water. In the process of filtration the important point is, first, that a proper layer of slime should be formed, and that it should not be disturbed during the process of filtration, and that when by further continuous deposit it becomes too thick and therefore too impermeable to water it should be removed. According to all appearance different natural waters are capable of producing the filtering mud layer in very different degrees, according to the amount of mineral and vegetable matter held in suspension. Some river waters which are especially rich in clayey constituents can deposit a good filtering mud layer in eight or ten hours. Other kinds of water, rendered more turbid by vegetable matter, require a longer time—at least twenty-four hours—to form the deposit. At certain periods of the year, especially at the time of the so-called "water bloom," owing to the appearance of innumberable microscopic algæ, the vegetable constituents suspended in the water are increased to an extraordinary extent and are of a particularly slimy character, and form, therefore, a layer, which in a few days becomes nearly impermeable to water, and must be removed. From these brief remarks it will appear that in sand filtration we are not dealing with so simple a matter as is often supposed. It has also been discovered that in the gradual wearing out of the sand layer it should never be allowed to get below a certain thickness—about 30 centimeters—and that a certain speed—about 100 millimeters in the hour—must be allowed for the movement of the water through the sand layer to obtain the most perfect purification."

Koch further states that a daily or triweekly bacteriological examination of the filtered water must be made in order to test the performance of the filter:

"If a filter works satisfactorily in every respect, experience shows that there will be found less than 100 germs capable of development in 1 cubic centimeter of water, and this is irrespective of the number of bacteria contained in the water before filtration."

The slightest changes in the rapidity of filtration or the disturbance of the surface of the filter bed becomes manifest on bacteriological examination.

The cholera epidemic in Hamburg in 1892 furnished an object lesson of great value. Hamburg and Altona both draw their water supply from the river Elbe. In Hamburg, in 1892, the water was furnished directly to consumers without filtration. In Altona, on the other hand, the water had been for a number of years filtered. The Hamburg supply was drawn from the river at a point where there was comparatively little pollution, but the Altona supply was drawn from the Elbe immediately after the stream had received the sewage of the entire population of Hamburg, numbering nearly 800,000. As a matter of fact, cholera bacteria were discovered in the Elbe water below the main outlet of the Hamburg sewers. There was every reason to expect, therefore, that the cholera would have been more virulent in Altona than in Hamburg, but the contrary was the case.

In Hamburg about 21,000 persons were attacked by cholera, of whom over 11,000 died during the epidemic. In Altona, on the other hand, there were not over 500 cases, 400 of which were shown to have been importations from Hamburg, thus leaving the small number of 100 cases traceable to infection in Altona or unaccounted for. Koch, who made a very careful inquiry into the circumstances of the outbreak at Hamburg, came to the conclusion that the comparative immunity of Altona was due to the filtration of its water supply.

Returning to the consideration of typhoid fever, we have in the United States an example of the limitations of this disease produced by the purification of the drinking water by means of filtration. For a number of years the city of Lawrence, in Massachusetts, had suffered from typhoid fever to an unusual degree. For the six years from 1887 to 1892 the typhoid deaths in that city averaged 50 annually, a proportion of 119 per 100,000 of population. In 1893 the drinking water, drawn from the Merrimac River, was subjected to filtration, and at once the typhoid death rate began to fall. In 1895, two years after the filtered water had been in general use in the city, the numbers of deaths had fallen to 16, of which 9 occurred among "operatives working in certain mills, where unfiltered water was used for washing purposes, and was used for drinking by the operatives, notwithstanding the prohibition of such use, because the river water was more accessible than the city water." (Quoted from a paper by Mr. Allen Hazen in the Health Magazine for March, 1896.) In 2 cases the disease was believed to have been imported and in 5 the origin was not accounted for.

The conditions under which filtration takes place have been studied particularly in the experiments made at Lawrence, above referred to. Without going further into the details of the construction of filters two processes must be kept in view—one, the removal or straining out of the bacteria, always present in the water, and the other, the oxidation of organic matter and its conversion into inorganic compounds. These imply that the materials of which the filter is constructed shall be sufficiently fine to hold back all suspended matters, and that a sufficient supply of oxygen shall always be present, in order to allow the oxidizing processes to go on. In most natural waters there is a sufficiently large quantity of free oxygen to allow the oxidizing processes to go on continually, but in cases where the water is highly polluted it is necessary to permit access of extra quantities of oxygen, in order that all the organic matter may be oxidized. This may be accomplished either by aeration of the water before filtration or by carrying on the filtration intermittently, allowing the air to penetrate the interspaces in the filter before the water is again turned on the filter. This is in effect what is done in the intermittent filtration or the broad irrigation of sewage.

In the experiments at Lawrence it was found that an average of 98.54 per cent of the bacteria found in the river water was removed by filtration. Under favorable conditions—i. e., with filters of the best construction and a moderate rate of flow—less than 1 per cent of bacteria remained in the water after it had passed through the filter.

Within the last two years an extended series of experiments upon filtration with so-called "mechanical filters" were made in Providence, R. I., with the view of adopting a system of filtration combining efficiency with economy. The apparatus most thoroughly tested is known as the "Morison filter," and its construction is described as follows:

"The filter bed of crushed quartz was 2 feet 10 inches in depth, supported upon a base of iron with circular perforations of about 4 inches in size, which were covered with screens. The crushed quartz used was the effective size of 0 59 millimeters. The filter was washed by a reverse current, which caused the quartz to boil. The agitation and friction of the particles were increased by means of a rake with long teeth, which revolved about a central column in the filter, the rake penetrating the bed by a screw motion from top to bottom."

One-half grain of basic sulphate of alumina was used to the gallon of water filtered, in order to produce a film upon the surface of the filter. This constitutes the real filtering layer, corresponding to the mud layer in the natural or sand filter.

The results obtained in these experiments showed that with careful management from 92 to 99 per cent of the bacteria contained in the water could be removed by mechanical filters. Further investigation demonstrated, however, that the installation and management of these filters would be more expensive than sand filtration, with no increase in efficiency.

On the whole, it is probable that sand filtration, having been thoroughly tested both by experiment and practical experience, must be regarded as the most efficient method of purifying a polluted water supply, and that when carefully and intelligently managed it can be depended upon for purification has been shown in the experience of Altona and Lawrence.

PRELIMINARY REPORT UPON CHOLERA IN JAPAN AND PLAGUE IN CHINA.

By W. F. ARNOLD, *Passed Assistant Surgeon, United States Navy.*

I. PRELIMINARY REPORT UPON CHOLERA IN JAPAN.

On November 16, 1895, I was notified by the United States minister to Japan that the imperial Japanese foreign office had extended to me through him full facilities for the prosecution of my inquiries, as requested by the admiral commanding the Asiatic station, upon the Department's instruction of September 16, 1895.

At this time cholera had disappeared from Japan, and the management of the principal temporary disinfecting stations of the Imperial Japanese army quarantine department had been transferred to the headquarters of the divisions in which they were situated; but I was enabled to observe their operations, as they were still engaged in disinfecting some transports that brought back smallpox cases from China early in December.

The following table shows the location, time of operation, etc., of the army quarantine department's stations:

Place.	Opened.	Transferred.	
Ninoshima (Hiroshima)	June 1, 1895	Oct. 31, 1896.	Headquarters V Division.
Hikoshima (Shimonoseki)	June 5, 1895	Oct. 31, 1896.	Headquarters VI Division.
Sakurajima (Osaka)	June 1, 1895	Sept. 15, 1896.	Home department station, Wadanomeseki.

The home department (civil) stations at Wadanomeseki and at Shimonoseki did army quarantine work from April 11, 1895, until May 31, 1895, and June 4, 1895, respectively. At the former station 24 ships and 6,205 sailors and coolies were inspected, disinfected, and retained five days under observation; at the latter, 86 ships and 34,949 men.

Table 2 gives the number of ships and men disinfected at the various army quarantine department's stations:

TABLE 2.

	Ninoshima.	Hikoshima.	Sakurajima.	Totals.
Number of ships	441	204	42	687
Number of men	137,614	76,656	18,076	232,346
Officers	1,791	766	225	2,782
Soldiers	53,045	30,630	9,682	93,357
Coolies, etc	41,332	27,008	4,764	73,104
Sailors	41,446	18,252	3,405	63,103
Number detained	28,990	12,826	4,883	46,699
Number developing cholera	474	256	91	821

The number of cases of cholera among troops and others after passing through these disinfecting stations is given as only 37.

The average time required for disinfection of the ships, which was done principally by scrubbing with stiff brooms and hand brushes and with a liberal use of carbolic solution, is one hour and twenty minutes. The longest time noted was twenty-eight hours and forty-six minutes. The average cost of process had not been ascertained at the time of my last application to the war department of the Imperial Japanese Government.

The erection and equipment of these temporary disinfecting stations and their very efficient operation in a period of about two months is an example of effective organization that is worthy of high praise. It is freely admitted that the stupendous task was not recognized early enough, having been brought up at a meeting of the central bureau of health late in March, 1895, and then not with immediate reference to cholera; and it is also stated by those in authority that only the plenitude of funds then immediately available for war purposes made its accomplishment feasible within the period named.

The slender facilities for printing in Hiroshima, and the absence from that city of the usual facilities for carrying on a work of this magnitude, made the unprecedented task of Dr. Shimpei Goto (whom circumstances compelled to assume it there under the immediate authority of Major-General Kodama, vice-minister of war and director army affairs bureau) of educating army officers of the line in matters of disinfecting and inspecting ships, and of enabling them to train their noncommissioned officers and men in the duties of orderlies in disinfecting work, an extremely anxious matter. In the eminently successful performance of this work this gentleman, who is the director of the sanitary bureau of the department for home affairs of the Imperial Japanese Government, has placed the maritime world under obligations to him for a colossal object lesson of the immense superiority of the plan of disinfecting ships that have been shown to be infected by repeated inspections to any system of quarantine conceivable.

The home department quarantine stations at Nakahama (Yokohama) and at Nagasaki disinfected many ships of the merchant marine and some of the Imperial Japanese navy and those of some other nations in the course of the prevalence of this epidemic, the most of which received infection in Japanese ports. On July 7, 1895, the U. S. S. *Petrel*, to which vessel I was then attached, left the harbor of Kobe without having granted liberty in that port, as it was deemed unsafe from what could be learned of the prevalence of cholera there and from the greater liability to infection owing to the festivities in progress there in celebration of the return of the victorious troops from China. At this time the only two other men-of-war there became infected with cholera, and one of them required two complete disinfections at home department quarantine stations, her crew being transferred ashore in each case.

While the consideration of the prevalence of this epidemic in China is not within the strict limitation of my detail of duty, it is very interesting to note that it prevailed throughout the entire empire with impartiality and with great virulence. Sixty thousand deaths are credited to Peking alone by reports that are based on the number of coffins made and sold, or on the number of funerals passing through certain gates of the city. There are no more exact vital statistics kept in China. This epidemic appears to have afforded indications to many independent observers that in many of the infected localities in northern China contaminated water was not the direct vehicle of infection; the appearances are, for the most part, merely general impressions derived from personal experiences in localities more or less well known to the observers. Many of them agreed very closely in stating a mode of spread that appeared to be in waves or in streaks, for which they were wholly unable to account.

The principal nations of Europe maintained at least their maxima of men-of-war (as compared with former years) in Chinese waters throughout the prevalence of this epidemic, but in spite of a considerable number of infections aboard individual ships their losses were small upon the whole. The crew of one protected cruiser suffered a simultaneous infection with cholera and with dysentery in Chefoo, notwithstanding all usual and strict precautions, and a serious siege of sickness aboard her followed, in the course of which her senior medical officer almost lost his life from cholera. This instance indicates, to my mind, the necessity of excluding the possibility of surreptitious communication with the shore under like circumstances, which, from the simultaneous appearance of two infectious diseases, would seem to have occurred in her case.

The details of the work of the Imperial Japanese army quarantine department, which is very indefinitely sketched above, will appear in extenso in my fuller report on cholera in Japan. I feel well assured that to its thoroughness more than to anything else is ascribable the fact that there were fewer cases of cholera in the whole of the Japanese Empire in 1895 than are believed to have occurred in the city of Peking alone in that year. The corrected figures of the sanitary bureau of the department for home affairs of Japan give 53,999 cases, with 38,500 deaths, being a mortality of 71.3 per cent, which, while not above that of the epidemic of 1890—a smaller epidemic—is still relatively very great. I attribute it partly to the increased virulence of the disease, which seems impressed upon almost all medical men long resident in the East, as a somewhat indefinite result of their experiences in epidemics of varying virulence, and partly to the patent fact that, as a very general rule, cholera patients in Japan are managed with quite as much reference to the protection of the community at large from infection by them as to the restoration of them to health; which last the almost invariable transportation in stretchers to more or less remote quarantine hospitals of itself greatly prejudices, since it excludes in great part the active treatment of the early stages that alone yields encouraging results.

Besides this, the disinclination of the sufferers to leave their homes leads to much concealment of this disease, with necessarily unfortunate results. It is thought that there is a sensible diminution of the prejudice against being treated in quarantine hospitals of late.

Some very commendable extensions of the employment of the disinfecting facilities of the department for home affairs have been made. A French missionary school for Japanese girls in Kobe became infected with cholera in the course of the 1895 epidemic, and all of its teachers, pupils, and employees were removed to the quarantine and disinfecting station at Wadanomeseki at the instance of the French vice-consul, with the result of arresting its spread at once. The facilities extended by these stations have been most highly commended by all who have had occasion to profit by their employment. Their maintenance and management are of the highest excellence.

Local sanitary measures are carried out with great intelligence and most praiseworthy thoroughness, as far as my observation extended, throughout the Japanese Empire. If a person fell sick of cholera in a theater in the midst of a performance, disinfection and any other measures considered desirable of enforcement were applied immediately by the health officers of the vicinage to as many of the audience as seemed to them desirable. The entire audience would be often taken under police surveillance for a time. Infected houses were often destroyed, and those adjacent to them were fully disinfected by the use of disinfectant solutions in practically all cases. In one well-known instance the occurrence of a case of cholera in the person of a servant in the household of an Imperial cabinet minister caused the segregation of all the members of the establishment for the danger period.

I do not believe that there is any great tendency for the statistical accounts to underestimate the number of cases; on the other hand, the penalty to all physicians of a fine of 100 yen for failure to report a case of infectious disease to the local health authorities exerts, in my opinion, the opposite influence.

I consider that the small number of cases that developed in 1896 (up to May 15, 1896, there had been 31 fatal cases of cholera out of a total of 46 cases reported, 38 of which occurred in a small epidemic focus in Chiba ken, near Tokyo) is due in great part to the absence, in a general way, of some condition or conditions essential to its endemicity in Japan. I am aware that this statement is not likely to pass unchallenged by many of the foreigners resident in that country; nor am I willing that it should be applied to detract anything from the results of the efforts of the sanitary bureau, the untiring and most actively intelligent interest of its officials in their work appearing to me to be most admirable.

It must, unfortunately, remain for some time perhaps a matter of opinion as to what proportion of errors in diagnosis occurs among the cases reported as cholera in years when it is not prevailing epidemically. It seems to me, from the meager accounts that I could derive from the Japanese press of the individual cases as they occurred, that these errors might be rather numerous.

The following results are derived from a collective inquiry directed to the medical attendants of quarantine cholera hospitals in those kens (prefectures) in which the disease had been measurably prevalent and made by the sanitary bureau, through the civil officials of the kens concerned, at my instigation and in the interval of my absence from Japan in southern China.

The total number of the circulars of inquiry sent out through the governors of the districts in which a comparatively large number of cases had been observed were 170. Of these 99 were answered, the 3 fu and 29 ken being reported more or less completely. In the localities from which I had returns, about 49,000 cases of cholera were noted in the official returns of the home department of the Imperial Japanese Government. My records embrace about 15,000 cases, of which some 1,700 occurred in private houses.

The percentage of mortality in my returns is 64.1 per cent, against 71 per cent of this epidemic.

They embrace a record of above 2,000 microscopical examinations of the excreta of patients, and more than 500 culture tests are mentioned.

Accounts of 18 reinfections (relapses) are returned, as well as of 19 persons that had suffered from cholera in previous epidemics.

Opinions based upon 2,000 cases of hypodermoclysis and upon 1,000 of enteroclysis (Cantani) and upon 250 of treatment with the serum of immunized animals by Kitasato's method are submitted. Besides these, 11 cases of intravenous injection are shown, as well as quite a variety of mixtures for subcutaneous use. Nearly all report upon the use of opium.

Seventeen hundred cases of eruptions (rashes, etc.) are given, and their presumptive bearing upon prognosis are indicated.

No specific instances of the detection of other agencies of infection than contaminated water and food are shown, and no cases of spreading infection by flies are detailed with convincing exactness.

Quite a variety of sequelæ are returned.

The consensus of opinion is adverse to the emphatic indorsement of any fixed plan of treatment.

It will be seen that routine bacteriological work for the sake of exactness in diagnosis is far from being the rule. The facilities offered by the Institute for Infectious Diseases in Tokyo were availed of by the local authorities only to a limited extent; but much effort is being devoted to changing this state of inexactness by the department for home affairs.

The most favorable results of treatment that I found were at Hikoshima. I think much importance attaches to the comparatively early stages in which the most of these cases were received, because the measures of treatment and the remedies employed differed in few essential particulars from those faithfully used elsewhere; so also with the percentage of mortality from it in 1895 in the Imperial Japanese navy. At Hikoshima thorough diagnostic proofs were lacking, so that here as elsewhere some cases were probably spurious cholera. Thirty-nine per cent only of 484 cases died; the average duration of treatment was 9.66 days in those that recovered. At Ninoshima 44.7 per cent of 700 cases proved fatal. Here the average period of convalescence was 11.25 days.

With regard to Kitasato's serum treatment, which appears to be in line with Haffkine's inoculation method and with Behring's recent work upon this subject, and which is described in full in the authoritative publication now issued from the Institute for Infectious Diseases in Tokyo, I had emphatic indorsements from the physician that gave it its most extended trial in one of the cholera hospitals in Tokyo, having employed it in 164 cases, with a mortality of 33.1 per cent. Several other physicians referred hopefully to it in their answers to my circulars of inquiry, but they were presumably without experience with it. One of Professor Kitasato's assistants, who had employed it upon 36 patients, 33.3 per cent of whom died, commended it also in a conversation with me. I deem it an unlucky incident of its test that it was employed so near the end—within two months—of this epidemic. In view of this essential modifying influence and of the other res justæ attending its employment as a remedial agent, it would not appear to be of very high therapeutic value.

It has been borne in upon me that long experience and nearly constant familiarity with the treatment of cholera seem to impress most physicians with the hopelessness of any known plan of treating successfully the advanced and fully characteristic stages of this malady. I have received this impression no less from many physicians foreign to the East, but long resident in China and in Japan, than from the inhabitants of these countries themselves. The recoveries that do occur from these advanced stages are difficult to connect with the remedies employed; hence a saying of the Japanese common people to the effect that under these circumstances little remains to do but to pray.

An interesting question that I could not follow out to my satisfaction is the relatively high immunity, which appears to be absolutely incontestable, upon the part of the Chinese residents in Japan. I once heard it ascribed, rather fancifully, I thought, to an alleged habit of theirs of chewing the residuum left upon opium pipes. But their admirable personal hygiene, which the modern Japanese lower classes admittedly fall far short of, save always in the matter of personal cleanliness, or a possible immunity acquired insensibly by them in their own country, where cholera is undoubtedly endemic, affords, as I consider, a better basis for either investigation or speculation regarding it.

Besides the comparatively limited character of the epidemic of 1895, and, following it, the leanest of all cholera years for Japan since the beginning of her scientific life, there remains to the credit of her progressiveness the practical exclusion of plague from the Island Empire.

II. PRELIMINARY REPORT UPON PLAGUE IN CHINA.

I sailed from Yokohama for Hongkong on the 25th of January, 1896, upon learning of an exacerbation of the plague in that colony, and I arrived there on February 3, 1896.

The governor of Hongkong and the colonial secretary furnished me readily with every facility for observing this disease, that proved to be steadily increasing; and many courtesies, that I am glad to acknowledge here, were extended to me by Acting Colonial Surg. J. M. Atkinson; J. A. Lowson, M. B., medical officer in charge of epidemic hospital; medical officer of health, Dr. F. H. Clark, and by all of the medical men there with whom I came in contact. I was also greatly assisted by Dr. J. C. Kerr, of Canton; by his assistant, Dr. Wan Tün Mo, and by Père J. B. Martinez, M. Ap., Procureur Général des Missions Étrangères, of Hongkong.

These opportunities obviated the necessity of my using the facilities that I had obtained in Peking for going into the interior of China to observe the plague, whose quiescence throughout 1895 had suggested to me the desirability of obtaining them.

In regard to its history it may be said briefly that I regard it as far from settled that it has ever prevailed in southern China in the remote past, notwithstanding the stories so painstakingly transcribed by M. l'Abbé Huc and so laboriously collected by Hecker. The plague is now constantly referred to in Canton under a name that was applied to a severe epidemic of influenza (la grippe) that prevailed epidemically there several years ago.

Only these facts seem settled: That it came to Canton not earlier than 1850, and most probably many years later, from Yunnan; that it reached that somewhat isolated province through Northern India, probably in the course of the Mohammedan rebellion in Yunnan, as it scourged the victorious Chinese troops after their capture and sack of Ta-li, the Mohammedans' capital; that it came to Hongkong from Canton.

Even the facilities for study, unique for China, that the Kennedytown Plague Hospital affords yield results that are far from exact, owing to the small staff of the institution and to the extreme conservatism of its inmates, who are, in nearly all cases, Chinese, with whom definite communications are always unsatisfactory to individuals of any other nationality than their own.

I think that there exists at present sufficient evidence to establish the causal relationship to this disease of a microorganism, isolated and described first by Kitasato and next by Yersin, at Hongkong, in June, 1894, which morphologically most nearly resembles the bacillus of chicken cholera. This organism may be found in the blood of affected individuals, although not with sufficient constancy—at least in stages early enough to be of great use clinically—to render negative results of value; and that it is given off from affected individuals and animals by any or by all of the secretions, save, perhaps, sweat and milk, excreta, and vomita, in a state dangerous to other human beings, to rats, and probably to house flies; and that infection may result to human beings from insensible breaches of continuity in the epidermis and through intact mucous surfaces.

Much confusion exists as to what animals are liable to infection with it; but it seems that most rodents are quickly killed by it, and they are unquestionably the most effective agents in its spread. In the way of infectiveness I consider that this organism has much in common with the organism of glanders, with which, of course, it has no real connection whatsoever, and I think that general means of disinfection, to yield any gratifying measures of success, will have to be reckoned carefully in these premises.

Fortunately there are some general conditions, although little is known of their exact nature, that have twice caused its decline almost to disappearance in southern China, and it must at length be accredited to them its disappearance from many of its former haunts before sanitation had begun to influence the duration of human life in them.

Once, at least, in 1894 and on three occasions this year, cases developed in Chinese aboard steamships en route to San Francisco through Japanese waters, and this after careful inspections—in some cases after repeated inspections—by experienced medical men in Hongkong. One case, a Chinese steerage passenger, was carried as far as Yokohama, where he was induced from the shrewd mistrust of his illness by his fellow-passengers to leave the ship surreptitiously before she sailed from that port and to go to a Chinese "hospital," in which he subsequently died. The cause of death in this case was verified by autopsy after exhumation.

Such narrow margins of safety in these vital matters decided the authorities of the Republic of Hawaii to send out a health commission, with the two members of which I conferred upon my return to Yokohama from the plague districts and whom I saw upon their return as I was sailing from Japan. I have strong hopes that the restriction which they may be able to have imposed upon the rather poorly-guarded Chinese passenger traffic across the Pacific Ocean may yield some salutary results.

Whether the experience of the Japanese with it this year in Formosa, whither it was carried by tea pickers from Amoy, will show the effectiveness of their superior personal cleanliness, remains to be seen.

I saw nothing that indicated to me anything like a racial immunity that was clearly independent of personal habits and position in life, and I believed very little of the great deal that I heard upon the subject.

One of the most interesting questions relating to the plague is the influence upon it of meteorological conditions. The more or less casual efforts in this field of more or less untrained observers have produced many amusing statements of causæ non causæ. High temperature and a low relative humidity of the atmosphere seem to do the most toward limiting its spread.

Recognizing in the great tendency to death from heart failure and in the damage to the peripheral circulatory system (the obvious effects of which, in the way of petechiæ, subcutaneous hemorrhages and the like, gave to this malady its old English name of black death), the results of ptomaine absorption, and having been convinced that the best treatment available in the East has done little more than to rescue a very small percentage of plague sufferers from death, and those usually from some of the tedious sequelæ that often follow the subsidence of the malady itself, I interested myself early in the efforts that Dr. Yersin was devoting to produce an antitoxin for it. With this purpose I made a short visit to him at his laboratory at Nha Trang, Annam, arriving there on March 27, 1896.

I had opportunities to observe, both here and at the Pasteur Institute at Saigon, the cultural properties of the plague bacillus, which, although derived from Dr. Yersin's original investigations at Hongkong in 1894, was still easily grown and virulent. He compared it to the bacilli of anthrax and of diphtheria with regard to these satisfactory cultural properties, and stated that his work with it at Nha Trang had been carried on without a thermostat until a few weeks previous to my arrival.

Owing to the difficulty of separating the toxin from the bacilli in cultures, intravenous injections into the jugular veins of horses of living cultures of this bacillus in gradually increasing doses have been systematically tried by him ("Annales de l'Institut Pasteur," Paris, July, 1895) with the result of yielding after quite a considerable interval a serum of whose efficacy as a curative agent its discover has assured himself. In a letter to me from Hongkong, written on July 21 last, he states that, as the result of then quite recent actual tests of it by himself in Canton and in Amoy, he has found it to act very efficaciously and happily in cases in which it had been applied before any signs of paralysis of the heart were observable. He found this condition—the most usual tendency to death in this disease—to be well-nigh hopeless. He has returned to Nha Trang to attend to its further elaboration and production.

It is my opinion that the results of this task so steadfastly pursued by this worthy pupil of the great Pasteur are of the very highest possible importance to the entire East.

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REPORT

OF THE

SURGEON-GENERAL, U. S. NAVY,

CHIEF OF THE BUREAU OF MEDICINE AND SURGERY,

TO THE

SECRETARY OF THE NAVY.

1897.

WASHINGTON:
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REPORT

OF

THE SURGEON-GENERAL,

UNITED STATES NAVY.

NAVY DEPARTMENT,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., October 1, 1897.

SIR: In obedience to instructions contained in Department's letter of July 6, 1897, I have the honor to report the operations of this Bureau for the last fiscal year, accompanied by a set of annual estimates for the fiscal year ending June 30, 1899, and statistical report showing the health of the Navy for the year 1896. The report embraces a statement of the condition of the naval hospital fund, the naval medical establishment, and other matters of interest pertaining to the duties of the Bureau of Medicine and Surgery.

NAVAL HOSPITAL FUND.

The condition of this fund is as follows:

Balance on hand July 1, 1896	$314,829.33
Transferred to the credit since July 1, 1896	103,950.22
Credit by appropriation for fiscal year 1897	20,000.00
	438,779.55
Expended since July 1, 1896	206,297.35
Balance on hand June 30, 1897	232,482.20

APPROPRIATIONS.

The regular estimates for the fiscal year 1899 are diminished by $600.

Estimates have been submitted for one ambulance for use at the naval hospital at Pensacola, Fla., where it is urgently needed.

An estimate of $1,000 for the cemetery of the United States naval hospital at Norfolk, Va., is submitted, the medical officer in charge of the above hospital having urgently represented the necessity for placing this cemetery in good condition.

An additional estimate is submitted for $15,000 to increase the capacity of the United States naval hospital, Washington, D. C., to meet the increasing wants of the station, as under existing conditions, and with the number of officers and men entitled to treatment steadily increasing, the present accommodations are inadequate. The administrative part of the building should be assigned to an annex provided for by estimate, leaving the entire hospital building to be used for its legitimate purpose.

NAVAL HOSPITALS.

Naval hospital, Widows Island, Me.—It is earnestly recommended that Congressional action be obtained for the disposal of this property, a bill to that effect having been prepared by the Bureau and submitted to the Department for its approval and transmission to Congress. In the meantime, minor repairs have been made to the building when deemed necessary.

Naval hospital, Portsmouth, N. H.—During the year repairs have been made to the steam and other pipes of the hospital building and boiler house and an improved duplex steam pump has been placed in engine room for use in case of fire and for supplying the water tank. "Welsbach" burners have been supplied throughout the hospital where needed, and minor repairs have been made to bath tubs and sinks. A room has been specially prepared and fitted up as a bacteriological laboratory, and a disinfecting plant of approved pattern has been introduced.

The hospital has been equipped during the year with a carefully prepared operating room, furnished throughout with the most approved modern furniture and appliances.

Naval hospital, Chelsea, Mass.—Blue prints have been made during the year showing the location of drains, sewers, water and gas pipes, and electric and steam connections. Minor repairs have been made to plank walks, fences, doors, windows and greenhouse, and the tin roof on ell of pesthouse has been painted.

Important improvements have been made in the establishment of a bacteriological, chemical, and microscopical laboratory for chemical work and in the preparation of an aseptic operating room which has been furnished with the most modern appliances and conveniences.

Naval hospital, Brooklyn, N. Y.—Since the new contracts were awarded and the bid for the new pavilion was accepted, the extensive repairs and new construction at this hospital have progressed rapidly and will soon be completed. In a previous report the extent and nature of the changes proposed were stated. The successful termination of the work will secure for the Navy every comfort and advantage in the treatment of the sick at this important station, and by increased accommodations meet the growing demands of the service.

The renovation of the main building has been very thorough; the new three-story brick building in the court contains general mess hall, dispensary and chapel, and operating room; a new electric elevator has been located between the main building and the courtyard building. The new pavilion, situated south of the main building, with which it will be connected by closed corridors, is nearing completion. The operating room on the top floor of the courtyard building will be thoroughly appointed and completely supplied. Every condition of hygiene has been considered and every means adopted to facilitate the employment of modern methods of surgical practice.

A new laundry sterilizer has been recently installed, and has met successfully the severe bacteriological tests applied.

The annex building for contagious diseases has been used in a number of cases during the year. In disinfecting this building, experiments have been made with the vapor of formaldehyde, but the bacteriological tests have not shown complete destruction of life in micro-organisms. Possibly this was due to nonobservance of details, though the process was carried out by those interested in the success of the method. As positive and satisfactory results obtained by others seem to justify every confidence in its use, further experimentation with the vapor will be made.

Minor repairs to grounds and outbuildings have been made during the year, and the efficiency of the steam-heating plant has been augmented by the addition of a new boiler and the installation of a powerful duplex pump. Additional radiators have also been distributed.

Naval hospital, Philadelphia, Pa.—In this hospital a large and well-lighted room has been prepared and equipped during the year as a bacteriological and chemical laboratory for clinical work. This improvement will add materially to the precision and accuracy of the work of the hospital.

Many repairs were made to the steam pipes and heaters, and the boilers and two pumps were overhauled. Three steam traps were also put in place, and have caused considerable economy in the amount of steam required.

Rubber matting has been laid in four wards and in the halls on the first floor, and the floor in the basement of both wings has been covered with cement.

By the establishment of a fixed standard of the highest grade for every article furnished, the supplies of this and the other hospitals have been materially improved.

The ambulance recently supplied has been of good service during the year, and the use of the portable bath tub has added much to convenience and effectiveness in the treatment of cases of fever.

Five cases of mumps and one of measles were treated, emphasizing the need of a separate building for contagious diseases.

The water supplied by the municipality is of poor quality, and the existing apparatus for purification has not been satisfactory. The Bureau intends to have a system of suitable filters installed in the near future that will meet the requirements of the hospital in this respect.

Naval hospital, Washington, D. C.—The ambulance allowed this hospital under appropriation approved June 10, 1896, has been employed frequently in the transportation of sick and wounded from the navy-yard. It is complete and modern, comfortably upholstered, and provided with stretcher, emergency case, and necessary supplies.

The chief improvement in the hospital during the year has been the completion of the operating room, which has been furnished with the most improved apparatus and surgical appliances. The room is conveniently located, with a good supply of natural and artificial light.

A disinfecting plant of modern design has been installed in the hospital, and adds much to the efficiency of the establishment.

Naval hospital, Norfolk, Va.—Many minor repairs have been made during the year, and considerable work has been done on the fences and grounds.

The river fence has been renewed and a considerable portion of the river wall has been rebuilt. New steam piping has been put in, to connect the heating system of the north and south wings of the hospital, and additional connections have been made between the driven wells.

The following repairs have also been made to the main building, viz: Repairing all gutters and down spouts, painting the veranda floors with two coats, and all the roofs, gutters, and down spouts with one coat. To improve the ventilation and light of the garret of the main building, six skylights on each wing, or eighteen in all, were placed in the roof and the work completed.

Naval hospital, Pensacola, Fla.—The work on this hospital, mentioned in the report of the previous year, has been completed. The roof of the hospital wards and dispensary has been reshingled and the guttering and leaders on main and veranda roofs have been thoroughly repaired.

Doors, blinds, sash, sills, joists, and flooring have been repaired or renewed as required, and all exterior woodwork has been repainted. Necessary repairs have also been made to the officers' wards and quarters and to kitchen, ice house, water-closets, and gates. This work has been done to prevent deterioration of building, and to have the hospital ready for immediate occupation in emergency, and was performed in a most satisfactory manner under the supervision and direction of the Bureau of Yards and Docks.

Naval hospital, Mare Island, Cal.—A thoroughly equipped and well-located operating room has been established in this hospital during the year, and a laboratory for bacteriological and chemical investigation will be in use at an early date.

Many minor repairs have been made to roofs, engine room, boilers, and fences, and extensive work has been done on the roads. Many improvements have been made in the furniture of the hospital, and additional ward chairs and rugs have been purchased.

The appropriation for the improvement of the cemetery has been well expended, the work under the contract having been satisfactorily completed in less than three months. The approaches were improved, iron gates substituted for the old wooden ones, the inclosing fence repaired, the avenue broadened and graveled, the terrace walls repaired, the whole area graded, and the graves properly aligned. Headstones, 275 in number, corresponding in character to those in the national cemeteries, were placed in position, each supported on a base of artificial stone. An additional appropriation would be required to supply new supporting bases to certain heavy monuments which have sunk out of line, to plant desirable shrubbery, and to complete the road from the north gate.

Naval hospital, Yokohama, Japan.—The walls of the lower ward of this hospital have been replastered during the year and all the interior woodwork repainted. The bathroom has been renovated, and on the hospital building minor repairs have been made.

IMPROVEMENTS AND REPAIRS AT NAVAL HOSPITALS.

Naval hospital, Brooklyn, N. Y.—The Department, under date of July 21, 1896, having declared forfeited the contract of J. M. Brosnan for this work, permission was received, and advertisements issued August 20, 1896, for proposals for improvements and repairs at the naval hospital, New York, in accordance with plans and specifications approved by the Department.

Five bids were received (and opened September 21, 1896) to complete the work of improvements and repairs at the United States naval hospital, Brooklyn, N. Y., as follows:

Thomas Dwyer, 106 East One hundred and sixteenth street, New York	$47, 000
D. S. Hess & Co., 876 Broadway, New York	38, 900
Arthur H. Weeks, 2150 Fulton street, Brooklyn, N. Y	32, 000
M. Gibbons & Son, 318 Columbia street, Brooklyn, N. Y	29, 975
Isaac A. Walker & Son, 1213 Filbert street, Philadelphia, Pa	26, 491

The firm of Isaac A. Walker & Son were the lowest bidders, but their proposal was $491 in excess of the available appropriation ($26,000). The question of scaling their bid so as not to exceed the amount available was duly considered and agreed to by this firm, and a contract was drawn up and signed on October 17, 1896, for the completion of this work. The improvements and repairs, a general account of which was embraced in the Bureau's last annual report, have been practically finished, and upon the completion of the additional building now being constructed by P. J. Carlin & Co., the hospital will be fully equipped for the care and treatment of the sick of the Navy, and will compare favorably with the most modern civil and military establishments at home and abroad.

Erection and completion of an additional building.—By act of Congress approved June 10, 1896, brick material was allowed to be used for construction of ward authorized by act approved July 26, 1894, and a similar additional ward allowed to increase needed capacity of hospital, making an amount of $50,000 available for the purpose, the same to be paid from that portion of the naval hospital fund accruing from the sale of naval hospital grounds to the city of Brooklyn and placed to the credit of the naval hospital fund, in pursuance of the provisions of the act approved July 2, 1890.

In view of the proposed increased accommodations for the sick, a board was recommended June 17, 1896, to determine upon and report to the Department the most desirable sites in the hospital grounds for the wards about to be erected under authority of the act referred to, and the approximate size and character of each ward; also to consider, in selecting the sites, the question of sunlight, accessibility to main building and court building under construction, preservation of architectural effect of hospital proper, and necessity of preserving harmony of all other buildings within the inclosure.

After a careful examination of maps and drawings, hospital buildings and grounds, the board recommended a building about 50 feet wide by 155 feet long, two stories high, with basement, built of buff-face brick and white marble or other light-colored stone trimmings, the building to be located parallel to the south wing of the main building and distant about 65 feet, thus receiving the sun's rays obliquely upon one side in the morning and upon the other side in the afternoon.

The recommendation of the board was approved by the Department.

Information regarding character of building, etc., was furnished architects in New York and Washington, upon their application, with permission to prepare preliminary drawings and estimates at their own risk and expense.

Satisfactory preliminary plans and specifications, approved by the Bureau October 5, 1896, for proposed new wards, were submitted by the firm of Smithmeyer & Didden, architects, of Washington, D. C., based upon the report of the board above mentioned, and authority was requested of the Department September 29, 1896, to have them present plans and specifications in detail, and to advertise for the work when such plans and specifications shall have been submitted and approved.

Upon receipt of Department's letter dated October 2, 1896, granting the desired authority, the architects were immediately notified to prepare the plans in question.

The detailed plans and specifications for the proposed wards were submitted by the architects (Messrs. Smithmeyer & Didden) November 2, 1896, and having been approved on the same date by the Bureau, advertisements were issued November 10, 1896, for the erection and completion of an additional building at the naval hospital, Brooklyn, N. Y.

The following bids were received and opened at 1 p. m., December 1, 1896, viz:

Thomas Dwyer, 106 East One hundred and sixteenth street, New York, N. Y.	$49,749
M. Gibbons & Son, 318 Columbia street, Brooklyn, N. Y.	47,253
Charles McCaul, 10 North Eleventh street, Philadelphia, Pa.	45,874
Isaac A. Walker & Son, 1213 Filbert street, Philadelphia, Pa.	45,860
Murphy Bros., 407 East One hundred and first street, New York, N. Y.	44,553
K. A. Murphy, 96 Linwood street, Brooklyn, N. Y. (granite)	44,200
P. J. Carlin & Co., 186 Remsen street, Brooklyn, N. Y.	44,000

Messrs. P. J. Carlin & Co. were the lowest bidders under the specifications for the proposed work, and were awarded the contract, which was duly signed December 14, 1896, and the firm informed under date of December 23, 1896, that they could enter upon the work at any time within ten days from such date.

The additional wards, when completed, will accommodate in times of peace 44 patients each, with four rooms for officers. The basement of the building will be laid in concrete, the walls to be built of burnt brick, the four fronts, cheek walls of main entrance, piers of porticos, chimneys, and piers of corridors to be faced with buff brick; and all stone, iron, and carpenters' work to be in accordance with the plans and specifications. The plumbing and gas fitting will conform with the regulations governing plumbing in the city of Brooklyn, N. Y., and the floors of bathrooms, lavatories, and vestibules of front entrance to be of granite mosaic laid in Portland cement. Combination gas and electric-light fixtures to be installed, and their selection to be made by the medical officer on duty in connection with the superintendence of this work. The building will be heated and ventilated in accordance with the most approved and modern systems.

Repairs of gatehouse, sidewalk, etc.—The entrance to the grounds has been materially improved by laying a sidewalk of artificial stone 680 feet long by 12 feet wide on Flushing avenue, extending the full length of the wall inclosing the grounds; by repairing the gatehouse, which has been enlarged and fitted up with steam heat, electric fixtures, bathroom, lavatory, etc.; and by the erection of two new gateways of ornamental and substantial pattern.

The early completion of the improvements and repairs and of the additional building at the hospital rendered it necessary that measures be taken toward renovating the grounds of the hospital inclosure. With this object in view a number of roadways through the grounds of the hospital were laid out and constructed; all old coal sheds, wooden outsheds, and fences were removed, and the entire grounds cleared of rubbish.

Naval hospital, Norfolk, Va.—The attention of the Bureau having been called to the urgent necessity of making extensive repairs to the annex building of this hospital, the commandant of the Norfolk Navy-Yard, upon the request of the Bureau, instructed Civil Engineer Asserson to make a careful examination of the building, and report upon the changes that he deemed necessary to put it in thorough repair.

Based upon the above report, repairs were commenced without delay, and on July 3, 1897, the Bureau was informed that the work previously authorized was completed.

The repairs consisted of the following, viz:

1. New sills were placed in the back of the porches, floors repaired where necessary, and eight 1⅝-inch round steel rods were put through

the buildings, with star anchors on the outside of each longitudinal wall, for the purpose of holding them together; also, six $1\frac{3}{8}$-inch tie rods were put in transversely and all slack mortar joints on outside of building re-cemented.

2. Weatherboarding on the fourth story covering in the water tanks has been repaired and a new floor put down in the tank room.

3. New floors and overhead ceilings have been put in throughout the annex, new partitions put in on all of the floors to properly divide up the rooms, and steam radiators have been reset to suit the alterations in the various rooms.

4. The two porches for the first and second floors, extending the whole length of the building and over on the north wing of the building about 20 feet, have been completely covered in in window casings front and back, so as to form a complete inclosure connected with both wings of the main building.

5. Sixty-eight pairs of glazed sash have been hung on pulleys and fitted so that they can be ceiled in pockets in the wainscoating during the summer months, when complete circulation of air is desired, and which will completely inclose the porches when the windows are shut.

6. Three complete sets of lavatories, including washout water-closets, porcelained urinals, and wash basins, have been put in the basement and on first and second floors; new concrete and cement covered floors have been put down in each of the three lavatories; partitions separating water-closets from wash room have been put up, and new doors fitted and put in place; all of the old plumbing, piping, etc., in these places has been taken out.

7. All of the new work has received three coats of paint, the plaster walls have been repaired, and whitewash has been used on the old walls where formerly used.

Naval hospital, Chelsea, Mass.—Under an act approved March 3, 1897, making appropriations for the naval service for the fiscal year ending June 30, 1898, and for other purposes. Congress inserted the following provision, viz:

> Naval hospital, Chelsea, Massachusetts: To enable the Secretary of the Navy to cause the removal of the brick wall in front of the United States naval hospital on Broadway, in the city of Chelsea, Massachusetts, and to substitute in place thereof an iron fence, six thousand dollars, and one thousand dollars of this amount, or so much thereof as may be necessary, shall be used to repair the sea wall on the water front of said naval hospital.

As soon as the appropriation became available (July 1, 1897), and acting in accordance with the provisions of the above law, plans and specifications were prepared under the direction of the Bureau, the work was duly advertised for, and bids opened at 1 p. m. on September 14, 1897.

The following proposals were received, viz:

Edwin S. Marks & Co., Plymouth, Mass	$4, 345
James Flynn, 76 Sudbury street, Boston, Mass	4, 145
P. F. O'Neil and James J. Brock, 193 Sudbury street, Charlestown	4, 130

The firm of P. F. O'Neil and James J. Brock being the lowest bidders were awarded the contract on September 24, 1897.

The specifications call for a granite foundation for the wrought-iron fence, extending from the northeast end of present brick wall to sea wall along present line of fence, the latter to be 6 feet high and substantially built, and painted with two coats of a carbonizing coating. There will be three wrought-iron gates, one double and two single. The specifications call for the commencement of the work ten days after notification to contractors by the Bureau that it is ready for them to enter upon the work, and they must prosecute the same so as to complete the contract in three calendar months.

Sea wall, naval hospital, Chelsea, Mass.—The same act contained an appropriation of $1,000, or so much thereof as may be necessary, to repair the sea wall on the water front of this hospital. The repairs are now being made and will soon be completed.

Naval hospital, Newport, R. I.—The naval appropriation for the fiscal year 1896, approved March 2, 1895, contained the following provision, viz:

> Naval training station hospital: For hospital for station, twenty thousand dollars.

As soon as the appropriation became available, plans were drawn and specifications prepared for a small hospital building, not to exceed in cost the amount authorized by law for its construction. Work on the building has been completed, and by Department's order dated November 12, 1895, was designated as a naval hospital, and subsequently transferred (September 29, 1896) to the Bureau of Medicine and Surgery, the senior medical officer of the station assuming charge of the hospital.

The hospital is a wooden structure of three stories, with two wings and a central administrative building. It consists of two wards, one in each wing, each with a capacity of twelve beds. On the second and third floors of the central building there are six rooms for sick officers, besides ample quarters for the accommodation of the junior medical officer attached to the hospital, who resides in the building.

The mess hall, kitchen, lavatories, bathrooms, water-closets, etc., are located in the administrative building.

Since the transfer of the hospital to this Bureau much work has been accomplished in properly fitting up the building for the reception and treatment of the sick. The hospital has been wired and the electric light introduced, chemical and bacteriological rooms fitted up; one of the rooms transformed into an operating room, and provided with a complete and modern antiseptic outfit. A disinfector, upon plans and specifications drawn under the supervision of the Bureau, is now being installed, and will be completed at an early date.

Naval hospital, Port Royal, S. C.—The naval appropriation bill for the fiscal year ending June 30, 1898, contains the following provision, viz:

> Naval hospital, naval station, Port Royal, South Carolina: For hospital at the naval station at Port Royal, South Carolina, four thousand dollars.

In accordance with the foregoing act, plans and specifications for a hospital building were prepared by Civil Engineer George Mackay, U. S. N., attached to the naval station, Port Royal, S. C., and after approval by the Bureau the work was advertised for July 12, 1897, and bids were opened at 1 p. m. August 3, 1897.

The following proposals were received, viz:

R. R. Legare, Port Royal, S. C	(*)
D. Getaz & Co., Knoxville, Tenn	$5, 978
Simons & Mayrant, 15 Broad street, Charleston, S. C	4, 575

The firm of Simons & Mayrant, No. 15 Broad street, Charleston, S. C., submitted the lowest bid. As their bid, however, was $575 in excess of the amount appropriated by Congress for the proposed hospital, the Bureau was unable to award the contract for this work, Messrs. Simons & Mayrant having declined to scale their bid within the amount authorized by law.

As it does not appear probable that the hospital can be constructed for the sum appropriated, viz, $4,000, the Bureau would recommend that

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[*] Blank bid.

the amount be increased to $5,000, and an estimate for $1,000 additional will be submitted to the Department at the proper time, with the request that it be transmitted to Congress with a favorable indorsement.

The hospital will be a two-frame structure of one story each, the sides weatherboarded, roofs tinned, connected and surrounded by verandas. The plans and specifications provide for two pavilion wards, each having accommodations for 6 patients, with a central administrative building, in which are located the surgeon's office, dispensary, nurses' rooms, bathrooms, water-closets, etc.

A small structure some 30 feet from and to the rear of the main building, surrounded by verandas and connected with it by a covered passageway, contains the kitchen, mess hall, etc.

Should an emergency arise, the number of beds in each ward could be readily doubled, thus affording accommodations for 24 patients. Under ordinary conditions, however, and with the present number of officers and men attached to the station, the proposed hospital is sufficiently large and well adapted to meet the requirements of the service.

EXTENSION OF NAVAL HOSPITAL, WASHINGTON, D. C.

The necessity of increasing the hospital accommodations for sick and wounded officers and men of the Navy becomes more imperative with the enlargement and growth of the naval establishment on this station.

Patients are received at this hospital chiefly from the navy-yard and marine headquarters, but from time to time they are transferred here from other hospitals, from coast survey-vessels, and from other vessels, foreign or belonging to our own Navy, which may be in port; also old sailors and marines on the retired list who have no suitable home, and when taken ill find a refuge here.

There is but one separate room in which a sick officer can be isolated. Additional accommodations should be provided, so that the two principal floors could be allotted to patients, the lower or main floor to officers, and the second floor to enlisted men.

The administrative part of the building should be assigned to an annex, which could be easily built within the present inclosure and in connection with the hospital proper, leaving the entire hospital building for its legitimate purposes.

The annual estimates submitted for the fiscal year 1899 contain an item of $15,000 for the proposed building.

CEMETERIES AT NAVAL HOSPITALS.

The plan initiated within the past few years of placing in a thorough state of repair the cemeteries attached to the several naval hospitals will be adhered to and continued by the Bureau until they have all been renovated and present a creditable appearance.

The improvements authorized by Congress for the cemeteries at Mare Island, Cal., and Brooklyn, N. Y., have been completed, and have put them in a condition to be easily cared for in future by the hospital employees. The medical director in charge of the United States naval hospital, Norfolk, Va., in a communication dated July 13, 1896, calls attention to the urgent necessity of renovating the cemetery at that hospital. The Bureau concurs in his recommendation, and the sum of $1,000 for this purpose has been submitted in the estimates.

NAVY-YARDS.

Navy-yard, Portsmouth, N. H.—The health of the yard for the past year has been excellent, as shown by the quarterly statistical reports.

Navy-yard, Boston, Mass.—The number of admissions to the sick list was somewhat greater than in the previous year, being 196. Of these, 82 were ascribed to climatic causes. A few cases of malarial fever appeared, but those affected had been exposed prior to arrival at the yard. Thirty-four persons were transferred to hospital, 12 with venereal diseases and 4 with alcoholism.

Two hundred and fifty-three vaccinations were performed during the year, and 65, or 25 per cent, were successful.

Marine barracks.—Improvements worthy of note are the introduction into the water-closets of new automatically flushed hoppers and open slate urinals, with new plumbing throughout. Increased ventilation has been secured in that locality by an opening cut through the wall facing the street. New washbowls, an additional bath tub, and two shower baths, with new plumbing, have been put in the bathroom.

The bakery, recently installed, is badly placed in a dark and poorly ventilated room under the southern end of the barracks. While part of the courtyard floor surrounding the drain inlet has been concreted, it appears that the whole of the floor space should be covered with waterproof material.

The same defects in ventilation which have been pointed out in previous reports exist in these buildings as a whole.

Prison.—Attention is called to the necessity of improving the ventilation, of substituting grating for the wooden fronts of the cells, and of abolishing the middle cells.

Drains.—The present condition is far from satisfactory. The drain from the houses at the south end of the yard has been connected with the metropolitan sewer system, but no other changes have been made to improve a system of drainage which is a constant menace to the health of the yard. It is hoped that all drains carrying sewage will be connected in the near future with the system of the metropolitan sewer company.

Dispensary.—The sanitary condition of this building has been greatly improved, but further repairs and modifications are, it is believed, under consideration.

Navy-yard, New York.—The sanitary condition of this yard has been satisfactory. No infectious or contagious disorder has appeared, and the general health has been good.

One hundred and thirty-four accidents occurred among the workmen employed in the yard, and fourteen of these cases were sent by ambulance either to their homes or to hospital. During the hot weather in August there were five cases of prostration in this class from exposure to high temperature. The following is the classification of the injuries and emergency diseases, all of which were given preliminary treatment: Vulnus contusum, 40; vulnus incisum, 8; vulnus laceratum, 40; stremma, 4; vulnus punctum, 3; contusio, 11; ambustio, 4; abrasio, 9; fractura, 9; appendicitis, 1; febris thermica, 1; prostratio thermica, 4. A death resulting immediately from falling into moving machinery is classed as fractura.

Marine barracks.—The health of the marine barracks has been good, but a number of cases of intermittent fever originated there, caused by work outside the yard, in digging a basin for boats, near the city market. A number of cases of follicular tonsilitis also occurred among members of the Marine Corps.

Navy-yard, League Island, Pa.—No important changes have been made in this yard. It is expected that the completion of the artesian well will remove one of the most insanitary conditions.

One case of typhoid fever occurred at the barracks, but as no other appeared, it probably was not due to any local cause.

Navy-yard, Washington, D. C.—While the health of the yard during the past year has not been satisfactory, the intensity of disease was not as great as in the previous year and the number of transfers to hospital and of sick days was less. As compared with 1895, malarial fevers, though very prevalent in the summer and autumn months, were somewhat less common. In 1895 there were 163 cases in a complement of 165 and during the past year 103 in a complement of 157. In the former year the cases of remittent exceeded those of intermittent fever, while the reverse was the case during the past year. The persons who have suffered most in proportion to their numbers are the seamen under instruction in gunnery. It appears that the situation of the seamen's quarters is responsible for some of this sickness, as their sleeping quarters are the lowest in the yard, and only 10½ feet above the lowest portion of the grounds. Measures have been undertaken to improve this condition, as it is understood that another building is being prepared for their accommodation. It is undoubtedly true, however, that the health of the yard can not be secured unless the Anacostia flats be reclaimed.

Surgical treatment was given in 60 cases of injuries occurring among workmen employed in the yard. These injuries are classed as follows: Incised wounds, 17; contused wounds, 17; lacerated wounds, 14; punctured wounds, 2; contusion, 5; fracture, 2; sprain, 1; hernia, 1; burn, 1.

Navy-yard, Norfolk, Va.—The health of the yard was not as satisfactory as during the previous year, as there were 162 admissions to the sick list from a force of 122 men. The daily average of patients was, however, only 1.48, as each case was under treatment but a short time. There were 30 cases of malarial disease admitted during the year.

Navy-yard, Pensacola, Fla.—The sanitary condition of the yard has been good, and the health of the officers and men has been excellent.

Navy-yard, Mare Island, Cal.—The health of the yard has been good during the year. Improvements have been made in the system of sewerage, and additional work is being done with that end in view. This work, it is believed, will greatly improve the sanitary condition.

The recommendations for a new building, to be used exclusively by the medical department, is urgently renewed, as the present accommodations are entirely unsuitable and not sufficient for the preservation of medical stores necessarily kept at the yard.

NAVAL STATIONS.

Naval station, New London, Conn.—The health of the station has been relatively good. A few cases of intermittent fever occurred, which readily yielded to treatment. Though this disease was not as prevalent as in the previous year, it marks the effect of the salt and fresh marshes adjacent to the reservation, and shows the advisability of a system of sewerage.

Naval station, Annapolis, Md.—While the number of sick days has been slightly greater than in the previous four years, the low rate of sickness reported for several years has been maintained. From influences outside of the Academy limits, one case each of typhoid fever, measles, and chicken pox occurred among cadets, and two cases of scarlatina in an officer's family. By the prompt adoption of preventive measures no other cases of these diseases appeared.

Attention is called to several cases of eye strain occurring among cadets working in deficient light, particularly in the rooms set apart for drawing classes. Wherever practicable, in default of a suitable building, skylights should be constructed and suitable overhead lights with reflectors provided.

The Academy buildings, several of which are unsatisfactorily heated and badly ventilated and lighted, remain in the unsuitable condition mentioned in the report of the previous year.

The game of football furnished 19 admissions to the sick list, with 68 sick days and 63 excuses from drill.

The installation of new and satisfactory water-closets in the cadet quarters is reported, as well as plans for the construction of a sewerage system throughout the old grounds and leading by one outlet into deep water, to replace the present defective system.

During the past year a room in sick quarters has been temporarily set apart and fitted with modern aseptic appliances as an operating room.

There is marked need at the Academy for an addition to the sick quarters to provide for an operating room, bacteriological laboratory, and consulting or prescribing room for cadets.

Marine headquarters, Washington, D. C.—While the health of the post has been satisfactory during most of the year, malarial disease has prevailed during the autumn, though not to the same extent as in 1895, when it caused nearly one-half of the total number of cases treated. During the year about one-third of the admissions to the sick list were on account of malarial poisoning. With the exception of 1895, when the exacerbation was very marked, there has been a steady increase in malarial disease at this post. It is thought very probable that cases of this disease can be diminished in number and severity by removing the sleeping quarters of the men from the ground floor. During the last quarter of the year there also occurred 5 cases of typhoid fever. A careful sanitary survey failed to determine a local cause. In view of the frequent arrival of recruits from other points and the full liberty given the men, the cause was believed to be without the post. It is, however, evident that the dormitories are old and also badly planned, and that other quarters should be provided for all those men now sleeping on the ground floor. Better facilities are also needed for making physical examinations, and suitable quarters should be provided for that purpose.

Naval station, Port Royal, S. C.—The health of this station has been fairly good, though the number of sick days has been double that of the previous year. A more sanitary condition is being secured by filling in low places and limiting the area of tidal overflow.

The cistern capacity is inadequate to the needs of the station, and water arriving in lighters from Port Royal is invariably contaminated with salt water.

Naval station, Puget Sound, Washington.—The average complement of this station during the year was 11. The health was remarkably good, as there were only 2 admissions to the sick list, and the diseases were of a very trivial character, the number of sick days being 4.

During the latter part of the year there was, however, a considerable increase in the number on duty at this station, and in view of its position and increasing importance, the necessity for a small pavilion hospital is becoming apparent.

RECEIVING SHIPS.

U. S. receiving ship Wabash.—The health has been excellent. No changes have been made in the ship, but external hygienic conditions have been improved by the completion of the metropolitan system of sewerage, which has given another channel for the flow of sewage that until recently contaminated the water and air about the ship from a sewer directly opposite.

During the year there were no admissions for venereal diseases, and but 6 transfers to hospital.

U. S. receiving ship Vermont.—The sanitary condition of the ship has been excellent and the health of the crew has been remarkably good.

During the year there were no deaths, and 192 new cases under treatment, with 33 transfers to hospital.

U. S. receiving ship Richmond.—The health of the ship has been good, and no disease has occurred attributable to any insanitary condition existing on board. During eight months of the year distilled water is used by the crew, but after the fires are extinguished the ship is supplied by a water boat with water from the Delaware River at the northern part of the city. While answering all chemical requirements, this supply of water can not be regarded as above suspicion, though apparently no harmful results have been traced to it.

The berthing space has been greatly increased by removal of projecting parts of the engine-room fixtures and by the addition of space formerly occupied by the sick bay and dispensary. Additional comfort has also been secured by uniting the forecastle and poop decks. An improvement in sanitation would result from the introduction of the incandescent lamp.

U. S. receiving ship Franklin.—A relatively large number of cases of remittent fever occurred during the year, due, it appears, to climatic conditions in the summer and autumn months. There were 3 deaths, 1 from typhoid fever and 2 from apoplexy. No sickness occurred that was traceable to any special cause in the ship, although the head and water closets forward have been in a faulty condition. As the decks are large and the number of men on board relatively small, there is never overcrowding.

The sanitary condition has been improved by the recent introduction of electric lights, supplied from the plant in the navy-yard.

U. S. receiving ship Independence.—The sanitary condition of this ship has not been satisfactory during the year. This seems to be due largely to the long period that the vessel has been in commission and to the condition of woodwork. The ratio per 1,000 of force daily sick was greatly in excess of that on the other receiving ships in spite of the more numerous transfers to hospital. The record shows 26 cases of malarial disease and 1 of typhoid fever. There were also 5 cases of mumps and 10 of rubella, due to the influence of San Francisco and adjacent cities. There were 58 transfers to hospital and 1,805 sick days in an average complement of 301.

NAVY PENSIONS.

Number of pension cases remaining on hand June 30, 1896	0
Number received during fiscal year ending June 30, 1897	2,696
Number answered during fiscal year ending June 30, 1897	2,696
Number remaining on hand June 30, 1897	0
Number of cases for board of medical examiners received and answered	152
Number of cases for retiring board received and answered	43
Number of cases from Judge-Advocate-General of the Navy received and answered	14
Number of cases from Civil Service Commission received and answered	19
Number of Congressional, Auditor for the Navy Department, and miscellaneous letters received and answered	120
Number of certificates of death received	124
Number of reports of medical survey received and acted upon	546
Number of reports of physical disqualifications received and acted upon	225

UNITED STATES NAVAL MUSEUM OF HYGIENE.

In his annual report, Medical Director Bates, in charge of the museum, gives an interesting sketch of the various steps through which this establishment has passed from its foundation, in 1882, to its present state of growth and development.

By order of the Department, the old Naval Observatory was transferred, January 20, 1894, to the Bureau of Medicine and Surgery, with the view of its being utilized as a permanent establishment for the United States Naval Museum of Hygiene.

The buildings of the museum, which were greatly in need of repairs when transferred to this Bureau, have been gradually renovated as the funds available for such purpose would permit; the grounds have been graded, the roads put in order, and the museum is now in a condition to carry out the purposes for which it was established. The new steam heating plant, to which attention was called in the Bureau's last annual report, has been introduced, and has proven to be efficient and economical.

With the view of enlarging the usefulness of the museum, the Bureau has had plans and specifications prepared for repairing the west wing of the building, work on which has commenced and will soon be completed.

The authorities in charge of the Centennial Exposition at Nashville, Tenn., having requested, through the Department, an exhibit from the museum, twenty-three cases were forwarded and are now on exhibition there.

The work of the laboratory has steadily increased, including a large number of water and urinary analyses, besides miscellaneous examinations, special reports, and experimental work on disinfectants, etc.

The museum is now permanently established in a building admirably adapted for all its purposes, having ample space for laboratory and lecture rooms and fully equipped bacteriological and chemical laboratories.

SUPPLY TABLE, MICROSCOPES, ETC.

The supply table of the Medical Department of the Navy has been employed with marked satisfaction throughout the service. Additions have been made from time to time in accordance with the advances in medicine and surgery, and it is believed that the outfits of ships and stations are now adapted to thoroughly meet the requirements of the naval service. The supply of surgical instruments and appliances is especially worthy of observation, as the old outfits have been systematically replaced by instruments of the best make and most modern pattern.

The cases of microscopes and accessories recently prepared under the direction of the Bureau have now been completed. Several outfits have already been supplied to hospitals, and a number are now ready for issue to ships. Every care has been exercised in the arrangement of these cases, and it is believed that they represent an improvement which will greatly increase the facilities for accurate diagnosis and lead to greater precision in the treatment of disease.

INSTALLATION OF DISINFECTING PLANT AT NAVAL HOSPITALS.

In the Bureau's annual report for 1896 mention was made of the fact that all naval hospitals would be equipped with sterilizers as speedily as possible consistent with good work.

The disinfectors have been installed at the following hospitals, viz: Portsmouth, N. H., Chelsea, Mass., Newport, R. I., Brooklyn, N. Y., Philadelphia, Pa., Washington, D. C., Norfolk, Va., and Mare Island, Cal.

Preliminary steps are now being taken by the Bureau for the installation of a disinfecting plant at the United States naval hospital, Yokohama, Japan.

ASEPTIC OPERATING ROOMS—BACTERIOLOGICAL AND CHEMICAL LABORATORIES.

All naval hospitals have been fitted up with modern aseptic operating rooms, and also with bacteriological and chemical laboratories, contributing greatly to the welfare of sick and wounded officers and men of the Navy and increasing the efficiency of these establishments.

BOOK OF INSTRUCTIONS.

The revision of the Book of Instructions for Medical Officers is proceeding gradually, as the work is undertaken in connection with the many changes perfected under the direction of the Bureau. It is expected, however, that it will be completed at an early date, and will include improved diet tables for hospitals and a uniform system of regulations for the administration of those institutions, together with instructions relating to recruiting, inventories, requisitions, surveys, sanitary reports, and methods to be observed in the care of supplies.

THE MEDICAL CORPS OF THE NAVY.

During the fiscal year ending June 30, 1897, the Department received 275 applications for information concerning the appointment of assistant surgeons in the Medical Corps of the Navy.

During the same year permits to appear before the naval medical examining boards, for examination for admission into the Medical Corps of the Navy, were issued to 44 candidates, as follows:

Pennsylvania	3	California	1
Georgia	1	Ohio	2
Massachusetts	4	Indiana	1
Maryland	3	Illinois	2
South Carolina	2	Missouri	3
New Hampshire	1	Michigan	2
Virginia	3	Florida	1
New York	9	Iowa	1
North Carolina	1	West Virginia	2
Tennessee	1	District of Columbia	1

Of the above number 36 appeared before the examining boards, of whom 8 were rejected physically, 19 rejected professionally, and 9 were found physically and professionally qualified for admission as assistant surgeons into the Medical Corps of the Navy.

The successful candidates were appointed from the following States, viz:

Pennsylvania	1	Virginia	1
New Hampshire	1	North Carolina	1
New York	1	California	1
Tennessee	1	West Virginia	1
Massachusetts	1		

Within the past year the number of vacancies in the Medical Corps has increased, there being 15 vacancies at the present time, nor does there appear to be any immediate prospect toward filling the corps.

Legislation looking toward the improvement of the present status of assistant surgeons in the Navy and placing them on a similar footing with assistant surgeons of the Army is urgently needed, and a bill having this object in view will be submitted to the Department for its consideration at an early date, with the recommendation that it be transmitted to Congress with a favorable indorsement.

PASSED ASSISTANT SURGEONS.

Congress during the past session passed the following act to commission passed assistant surgeons in the United States Navy and to provide for their examination preliminary to their promotion to the grade of surgeon:

> *Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That passed assistant surgeons now borne upon the Navy Register shall be commissioned as such by the President, such commissions to bear the dates upon which said passed assistant surgeons, respectively, received their appointments as such; and hereafter assistant surgeons shall be regularly promoted and commissioned as passed assistant surgeons, and passed assistant surgeons as surgeons, subject to such examinations as may be prescribed by the Secretary of the Navy: *Provided, however*, That no examination of passed assistant surgeons shall be ordered until the expiration of six months from the passage of this act, during which time promotions shall be made as now provided by law.

In accordance with the above law, and to carry out the provisions contained therein, the following special circular (No. 29), dated February 25, 1897, was issued by the Department, viz:

> The following regulations, designed to meet the requirements of the act of Congress approved February 13, 1897, entitled "An act to commission passed assistant surgeons in the United States Navy, and to provide for their examination preliminary to their promotion to the grade of surgeon," are hereby published for the information and guidance of all concerned:
>
> I. From and after August 13, 1897, passed assistant surgeons entitled to promotion shall be examined, in accordance with existing law relating to examination and promotion of officers in the Navy, as to their mental, moral, professional, and physical qualifications for promotion to the grade of surgeon, such examinations to be held, whenever practicable, within the United States.
>
> II. Examinations shall be made under the following heads:
>
> 1. Mental and moral.
> 2. Professional.
> 3. Physical.
>
> The mental, moral, and professional examinations shall be conducted in accordance with the provisions of Articles 1708 and 1709, United States Navy Regulations, and the board will make its report in accordance with the provisions of Article 1710 of said regulations. The professional examination shall comprise the following subjects:
>
> (*a*) Navy regulations so far as they relate to the Medical Department or to the medical officer as an officer of the Navy.
>
> (*b*) Thesis, general and naval hygiene.
>
> (*c*) Thesis, clinical medicine, including recent progress in etiology, pathology, and therapeutics.
>
> (*d*) Practical work in bacteriological and chemical laboratory.
>
> (*e*) Microscopy and microbiology, in relation to diagnostic work.
>
> (*f*) Military surgery, including new operative procedures and the technique of aseptic surgery.
>
> The physical examination will be conducted in accordance with the provisions of Article 1707, United States Navy Regulations.

The service is to be congratulated on the enactment into law of the above bill, which will have a far-reaching effect in stimulating the younger members of the corps in their scientific and professional studies, while increasing the efficiency of the Medical Department of the Navy.

MEDICAL ASSOCIATIONS.

Pan-American Medical Congress.—The Mexican Government, through its minister at this capital, extended an invitation, under date of February 23, 1896, to this Government for representatives from the Medical Department of the Navy to be present at the second Pan-American Medical Congress.

The congress met in the City of Mexico on the 16th, 17th, 18th, and 19th of November, 1896, and Medical Director George W. Woods, U. S. N., in charge of the United States naval hospital, Mare Island, Cal., was ordered by the Department to represent the Medical Corps of the Navy. An interesting paper prepared by him, entitled "Intestinal obstruction," and presented for discussion before the meeting, will be read with much interest.

American Public Health Association.—Upon the request of the secretary of this association to the Department for representation at their twenty-fifth annual meeting in Buffalo, N. Y., September 15–18, 1896, Medical Director N. L. Bates, in charge of the United States Naval Museum of Hygiene, was ordered to represent the Medical Department of the Navy.

The next meeting of the association will be held at Philadelphia, Pa., October 26–29, 1897.

Association of Military Surgeons of the United States.—This association held its seventh annual meeting at Columbus, Ohio, May 25 to 27, 1897, and the Medical Department of the Navy was represented by Medical Inspector J. C. Wise and Surg. Philip Leach.

The eighth annual meeting of this association will be held in Kansas City, Mo., June 1, 2, and 3, 1898.

The American Medical Association.—The forty-eighth annual meeting of the American Medical Association was held in Philadelphia, Pa., June 1–4, 1897, and the Medical Department of the Navy was represented by Medical Directors W. K. Scofield and George H. Cooke and Medical Inspector W. G. Farwell.

Twelfth International Medical Congress.—In compliance with a request from the Russian Government, dated March 6, 1897, forwarded through the Secretary of State to the Navy Department, for delegates to represent the Medical Corps of the Navy at the Twelfth International Medical Congress, Medical Director W. K. Van Reypen, U. S. N., was appointed, and was ordered on the 7th of June, 1897, as a naval medical delegate to attend the meeting of the Congress to be held in Moscow, Russia, August 19 to 26, 1897. The Russian Government was also officially informed that Medical Director Van Reypen would prepare and submit to the congress for discussion a paper entitled "Handling and care of wounded in modern naval warfare." A copy of this paper will be found among the special reports.

Upon the adjournment of the congress, and before returning to the United States, Medical Director Van Reypen was instructed to visit and inspect the museums of Berlin and Paris, paying special attention to and reporting upon all matters relating to naval hygiene.

International Conference of Hygiene and Sanitary Service on Railways and Shipboard.—The Department having been officially invited, under date of May 10, 1897, to send delegates to the above-mentioned conference, Surg. James D. Gatewood, U. S. N., was appointed, and was ordered on the 27th of July, 1897, as a delegate to represent the Medical Department of the Navy at the second meeting of the conference, to be held at Brussels, Belgium, the 6th, 7th, and 8th of September, 1897.

The Belgium Government was also informed through official channels that Surgeon Gatewood would prepare and submit for discussion at the conference a paper entitled "Physical examinations and sanitation in the United States Navy."

During the meeting of the conference this officer was directed to pay special attention to the discussion of all subjects pertaining to hygiene and sanitary service on shipboard.

International Conference on Leprosy.—The German Government, through its ambassador at this capital, extended an invitation, on May 21, 1897, to the Department to be represented at an international conference to be held at Berlin, Germany, October 11 to 16, 1897, for the purpose of discussing the leprosy question.

The object of the conference, as outlined in its programme, is primarily a scientific discussion of the leprosy question, with a view to the formulation of the results as a basis for legislation and international agreement by the Governments of the countries concerned in the efforts to limit or suppress the disease.

Surg. James D. Gatewood was appointed a delegate to represent the Medical Department of the Navy at this conference, and the German Government was informed officially to that effect.

In the letter of special instructions issued by this Bureau, Surgeon Gatewood was directed to give particular attention to the measures proposed for checking and suppressing the disease and to any legislation on the subject suggested by the conference.

Investigation of plague in China and cholera in Japan.—Upon the request of the Surgeon-General of the Navy, and by direction of the Department, P. A. Surg. W. F. Arnold was detached from the U. S. S. *Petrel*, Asiatic Station, and ordered, September 16, 1895, on special duty in connection with the investigation of the outbreak of plague in China and of cholera in Japan, and the United States representatives in those countries requested to obtain the necessary authority to enable him to carry on the work desired.

Dr. Arnold's duty extended over a period of ten months and, being completed, he was detached and ordered home July 1, 1896.

A detailed account of his investigations will be found among the special reports.

GENERAL SANITARY RULES.

The necessity for a comprehensive and uniform system of sanitary rules, to which attention was called in several previous reports, has been recognized, and a carefully-considered circular of instructions, prepared by this Bureau, was issued by the Department under date of April 8, 1897.

The circular deals with the following important subjects:

(*a*) Ventilation.
(*b*) Water supply.
(*c*) Food.
(*d*) Clothing.
(*e*) Infected ports.
(*f*) Unhealthy ports and precautionary measures to be observed.
(*g*) Yellow fever, cholera, and smallpox.
(*h*) Infections on board ship.
(*k*) Disinfection.
(*l*) Precautions to be observed by landing parties in unhealthy localities.

The promulgation of this circular is a decided advance in efforts to promote the sanitary interests of the service, and doubtless will be attended by beneficial results.

REVISION OF DIET TABLES AT HOSPITALS.

A new full diet table for the use of the various naval hospitals has been compiled by the Bureau during the year, and is now in use. In the preparation of the table every care has been exercised to provide for a proper quantity of the various proximate principles in a variety of foods suitable for hospital patients on a liberal diet.

The table represents the results of careful calculations, associated with consideration of the preferences developed by a seaman's life, which have been given such weight as the circumstances permit.

The uniformity now secured in the full diet at the various hospitals is of great importance, and by a better selection and adjustment of foods will lead not only to increased comfort, but also to greater content and better results in the treatment of disease.

PORTABLE OPERATING TABLES.

The outfit furnished the Medical Department of the Navy has been improved and elaborated from time to time as the value of new therapeutic preparations and modern surgical instruments and appliances for the care and treatment of the sick have been practically demonstrated and brought to the attention of the Bureau.

For some time past the desirability of substituting a more modern aseptic operating table, and one of uniform standard, for obsolete pattern now used for this purpose on board of our ships has been recognized, and with this object in view, a board of medical officers (upon the recommendation of this Bureau) was ordered by the Department, under date of December 7, 1896. The board, after careful consideration, recommended the adoption of a "portable operating table" constructed by a local New York firm in accordance with designs furnished them by a medical officer of the Navy. Their report states:

> We find the table simple and strong in its construction, compact when folded, and easily handled; the latter consideration being quite essential in the modern ships, where its use may be required in different parts of the ship. We can suggest no changes for its improvement, and we recommend it for use on board ship.

The report of the board was submitted to the Department, and having been approved by the Bureau, the director in charge of the United States National Laboratory and Department of Instruction was instructed to issue the new portable operating table as a part of the outfit of all vessels going into commission, and to furnish them upon approved requisition to ships already in commission.

AMBULANCES.

All of the naval hospitals have been furnished with ambulances, with the exception of those at Newport, R. I., and Pensacola, Fla., and in the annual estimates for 1899 an item of $600 has been inserted for supplying an ambulance at the Pensacola hospital.

So carefully were the needs of the service considered in the selection of a type for the first three ambulances which were furnished to the hospitals at New York, Boston, and Norfolk, respectively, that in the specifications and plans adopted for those subsequently ordered the original design has been practically unchanged, notwithstanding the fact that close attention has been given to such changes as have from time to time been made in ambulance construction on the part of the various civil hospitals and departments of public charity.

HANDLING SICK AND WOUNDED—AMBULANCE SHIPS.

In several previous reports the Bureau has called the attention of the Department to the advisability of adopting such measures for the care and treatment of the sick and wounded officers and men as may be necessary to meet the requirements of modern naval warfare.

New methods of succor for the wounded must be devised to meet the conditions which now confront the medical officer, and with this object in view plans for an ambulance ship have been prepared, under the supervision and direction of Medical Director W. K. Van Reypen, U. S. N., and his paper, read before the Twelfth International Medical Congress, held at Moscow, Russia, August 19 to 26, 1897, giving a detailed description of a vessel designed especially for this purpose, will be found among the special reports, and will be read with great interest.

NAVAL HOSPITAL CORPS.

With the near approach to completion of the improvements and repairs at the several naval hospitals, which were commenced a few years ago, and as a result of which these institutions are now placed on an equal footing with our leading civil establishments in all that pertains to modern medical and surgical requirements, the necessity of making suitable provision for the equipment of a naval hospital corps becomes more urgent, and attention is again called to the proposed bill for the establishment of such an organization, submitted to the Department under date of February 3, 1896, and which, in its essential details, was incorporated in the Bureau's last annual report.

The importance of special training on the part of those who, as attendants, are intrusted with the care of the sick has so impressed itself upon the management of civil training schools that in many instances the length of time to be devoted to such study has been increased from two to three years, and when it is considered that as a rule the students of such institutions enter upon their special course of training with a reasonably fair preliminary education, the absolute unfitness of naval nurses (baymen) under the present system of appointment, without even an elementary knowledge of the duties required of them, is too obvious for serious discussion.

Careful attention is being paid by the principal foreign Governments to the development and perfection of this branch of military organization, and measures looking toward the same end have already been adopted by the National Guard and Naval Militia in many of the States of the Union.

The steady advance in general favor and efficiency of the Hospital Corps of our own Army, which has been organized upon a system capable of being developed to meet every emergency, accentuates very pointedly the deficiencies existing in this department of the Navy, and demonstrates conclusively the necessity of initiating without delay such steps as may be deemed advisable by the Department to organize and perfect a naval hospital corps, and place it on a basis commensurate with the requirements of the service.

X-RAYS.

The experience of the medical profession at home and abroad, within the past two or three years, confirms beyond a reasonable doubt the favorable impressions first entertained in regard to the efficacy of the Roentgen rays and their successful application in the domain of surgical diagnosis.

With the aid of the fluoroscope the present resources of clinical medicine have been much supplemented, and the determination of visceral outline in health and disease brought within the limits of scientific accuracy.

Many of our modern civil hospitals, recognizing its present importance and the possibilities of its future development, have been fitted up with the apparatus necessary for undertaking such work, and it is the intention of the Bureau to install, as soon as practicable, facilities for similar research in the principal naval hospitals.

The health record of the Navy and Marine Corps for the year 1896 has been satisfactory, as shown by the statistical tables embraced in the body of the report.

Very respectfully,

J. C. BOYD,
Acting Chief of Bureau.

The SECRETARY OF THE NAVY.

Estimates of appropriations required for the service of the fiscal year ending June 30, 1899, by the Bureau of Medicine and Surgery, Navy Department.

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1898.
SALARIES.			
Chief clerk (appropriated, act of February 19, 1897)	$1,800.00		
One clerk of class 3 (same act)	1,600.00		
One clerk of class 2 (same act)	1,400.00		
One clerk of class 1 (same act)	1,200.00		
One clerk (same act)	1,000.00		
One laborer (same act)	660.00		
One janitor for naval dispensary (same act)	600.00		
One laborer for naval dispensary (same act)	480.00	$8,740.00	$8,740.00
MEDICAL DEPARTMENT.			
For surgeons' necessaries for vessels in commission, navy-yards, naval stations, Marine Corps, and coast survey, and for the civil establishment at the several naval hospitals, navy-yards, naval laboratory, and department of instruction, museum of hygiene, and Naval Academy.—(Appropriated, act of March 3, 1897)	65,000.00	65,000.00	65,000.00
NAVAL HOSPITAL FUND.			
For maintenance of the naval hospitals at the various navy-yards and stations, and for care and maintenance of patients in other hospitals at home and abroad.—(Appropriated, act of March 3, 1897)	20,000.00	20,000.00	20,000.00

Estimates of appropriations required for the service of the fiscal year ending June 30, 1899, by the Bureau of Medicine and Surgery, Navy Department—Continued.

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1898.
CONTINGENT, BUREAU OF MEDICINE AND SURGERY.			
For freight, expressage on medical stores, tolls, ferriages, transportation of sick to hospital, transportation of insane patients; care, transportion, and burial of the dead; advertising; telegraphing; rent of telephones; purchase of books and stationery; binding of medical records, unbound books and pamphlets; postage and purchase of stamps for foreign service; expenses attending the medical board of examiners; rent of rooms for naval dispensary; hygienic and sanitary investigation and illustration; sanitary and hygienic instruction; purchase and repairs of wagons and harness; purchase of and feed for horses and cows; trees, plants, garden tools, and seeds; furniture and incidental articles for the museum of hygiene, naval dispensary, Washington; naval laboratory, sick quarters at Naval Academy and marine barracks, surgeons' offices and dispensaries at navy-yards and naval stations; washing for medical department at museum of hygiene, naval dispensary, Washington; naval laboratory and department of instruction; sick quarters at naval academy and marine barracks, dispensaries at navy-yards and naval stations, and ships and rendezvous, and for minor repairs on buildings and grounds of the United States Naval Museum of Hygiene, and all other necessary contingent expenses (appropriated act of Mar. 3, 1897) ..	$30, 000. 00	$30, 000, 00	$30, 000. 00
REPAIRS, BUREAU OF MEDICINE AND SURGERY.			
For necessary repairs of naval laboratory and department of instruction, naval hospitals and appendages, including roads, wharves, outhouses, sidewalks, fences, gardens, farms, and cemeteries (appropriated act of Mar. 3, 1897)	20, 000. 00	20, 000. 00	20, 000. 00
AMBULANCE FOR NAVAL HOSPITAL.			
For supplying one naval hospital with ambulance of modern construction to replace vehicle condemned as useless (appropriated act of Mar. 3, 1897)	600. 00	600. 00	1, 200. 00
NAVAL CEMETERY, UNITED STATES NAVAL HOSPITAL, NORFOLK, VA.			
For labor and material for widening of approaches and repairing and painting all gates and fences; for making graveled roads and paths, building walls where necessary, properly grading the whole area, and planting appropriate shrubbery (appropriated act of Mar. 3, 1897..	1, 000. 00	1, 000. 00	1, 000. 00
SUBMITTED.			
For annex to United States Naval Hospital, Washington, D. C., to increase accommodations for sick officers and men on the station...................................	15, 000. 00	15, 000. 00	....
EXPLANATORY NOTE.—The capacity of this hospital is not sufficient to accommodate the patients who are received from the United States Marine Barracks and Navy-Yard, Washington, D. C.; Naval Proving Ground, Indian Head, Md.; Naval Academy, Annapolis, Md.; naval vessels temporarily at the navy-yard, including those of the Fish Commission and Coast Survey: officers of the Navy and Marine Corps on special duty, and those on the retired list residing in Washington, D. C., who are also entitled to treatment in this hospital.			

STATISTICAL REPORT

OF THE

HEALTH OF THE NAVY AND MARINE CORPS FOR THE YEAR 1896.

The health record of the Navy and Marine Corps for the calendar year 1896 has been relatively very satisfactory. When compared with the previous year, there has been a considerable decrease in the admission rate and also a marked diminution in the number of deaths, though the force has been increased 7.62 per cent. The average strength of the active list for the year 1896 was 14,196. Complete returns were received by the Medical Department from a total force of 13,768, the difference representing those from whom no returns were received except reports of survey and certificates of deaths.

The total number of admissions for disease and injury was 10,708, which is in the ratio of 777.75 per 1,000 of strength, being a decrease, compared with the previous year, of 60.78 per 1,000. The ratio for disease was 628.42 and for injury 149.33. The ratios for the previous year were 838.53, 673.19, and 165.34, respectively.

The daily average of patients was 409.03, a ratio of 29.71 per 1,000, while that for the previous year was 34.27, a decrease of 4.56 per 1,000. The number of persons invalided from service (including retirements of officers for disability and transfers to Government Hospital for the Insane) was 244, a ratio of 17.19 per 1,000 of force. Two hundred and eight cases were invalided for disease and 36 on account of injuries, the ratios being, respectively, 14.65 and 2.54. This is a slight increase over the previous year, for which the total ratio was 15.61, that for disease having been 13.34 and for injuries 2.27.

The total number of sick days was 149,706, which is an average of 10.87 days for each man of the Navy and Marine Corps and 13.98 days for each case treated. The averages for the previous year were 12.51 and 14.92 days, respectively. It appears that, compared with the previous year, there was not only a smaller admission rate, but that with an increased force the total number of sick days was much less.

The number of deaths was 78 (64 from disease and 14 from injury, including poison). The death rate was 5.49 per 1,000 of strength (4.51 for disease and .98 for injury). With a smaller force, the number of deaths for the previous year was 90 (70 for disease and 20 for injuries), the death rate having been 6.82 (5.31 for disease and 1.51 for injury). The decrease in the death rate for 1896 was therefore 1.33 per 1,000.

During the year there were admitted to the sick list of the total force 850 cases of malarial diseases, 593 of wounds, 586 of rheumatic affections, 468 of diarrhœal affections, 400 of epidemic catarrh, 201 of alcoholism, 66 of pneumonia, 59 of heat stroke, 56 of typhoid fever, 48 of pneumonic tuberculosis, 31 of mumps, 16 of nephritis, 15 of measles, 14 of organic heart disease, 11 of erysipelas, 5 each of cholera and smallpox, 4 of scarlet fever, and 2 of varicella. The slight diminution, when comparison is made with the previous year, in the total number of malarial cases is due to the smaller number of such cases returned from Washington, D. C. While in the previous year the influences at the Washington navy-yard and marine headquarters were responsible for nearly one-fourth (213) of all admissions for malarial diseases, in 1896 the cases (140) returned from that station were about one-sixth (p. 44). Of the 59 cases of heat stroke, 40 were caused by heat in fire and engine rooms, 7 of the latter being returned from the *Raleigh*, 5 from the *Indiana*, 4 each from the *Amphitrite* and *Massachusetts*, 3 each from the *Maine*, *Newark*, and *San Francisco*, and 2 each from the *Cincinnati*, *Alert*, and *Marion*, the remainder (5) occurring scattered, 1 on a ship. The number of such cases for the previous year was 92, of which 58 were caused by heat in fire and engine rooms, the *Amphitrite* having returned 23 due to that cause and the *Raleigh* 7. While the number of cases of epidemic catarrh has, compared with the previous year, diminished, that of typhoid fever has increased. Of the 56 cases of the latter disease, 33 occurred in the force afloat, 21 of which developed on the cruising vessels of the North Atlantic Station, 5 occurring on the *Massachusetts*, 4 each on the *Indiana*, *Bancroft*, and *Maine*, 2 on the *Texas*, and 1 each on the *New York* and *Alliance*. That station returned only 8 cases of the disease during the previous year. It is worthy of note that all the ships returning the greater number of cases had been recently commissioned, and most of them recently completed (p. 38). There were 5 cases of cholera during the year, and they all occurred on the *Boston* (p. 47). Five cases of smallpox were also returned, 2 from the *Monocacy* and 1 each from the *Charleston*, *Petrel*, and *San Francisco* (p. 40). During the previous year there were 2 cases of cholera and 1 of smallpox. Of the 7 cases of cholera that occurred during the two years, 6 were due to influences at Shanghai, China, and the original cases were contracted while on liberty. The other case was attributed to bathing in the waters of an infected port.

No case of yellow fever occurred during the year. There was a large increase, compared with the previous year, in the cases of mumps, one-half of which occurred in the cruising vessels of the North Atlantic Station (p. 38). During the year there were admitted to the sick list 335 cases of gonorrhœa, 199 of secondary and 40 of primary syphilis, and 131 of chancroid—a somewhat smaller number than in the previous year, though the total force was considerably greater. There were 593 cases of wounds, 440 of contusion, 404 of sprain, 132 of fracture, 93 of burn, 50 of hernia, 42 of abrasion, 24 of luxation, 17 of concussion, and 10 of drowning. The prevalence of these special diseases and injuries on the various stations is shown in the detailed statement of the health of each station.

The deaths in the total force were due—11 to pneumonia, 10 to typhoid fever, 8 each to drowning and apoplexy, 5 to pneumonic tuberculosis, 4 to nephritis, 3 each to alcoholism and aneurism, 2 each to pernicious anæmia, angina pectoris, and broncho-pneumonia, and 1 each to asphyxia (coal gas), carcinoma, chronic intestinal catarrh, cholera, cholera morbus, valvular heart disease, chronic dysentery, epithelioma, erysipelas, cerebro-spinal fever, chronic hepatitis, spinal luxation, intestinal obstruction, osteoma, heat prostration, syphilis, acute miliary tuberculosis, septicæmia, gunshot wound (suicide), and cause undetermined.

The deaths by violence and suicide were as follows: Drowning 8, and asphyxia from coal gas, spinal luxation, and suicide by shooting, 1 each.

During the year 8,935 persons were vaccinated and the results were determined in 6,958 cases, in which the percentage of success was 25.37. Of these, 6,588 had marks of previous vaccinations and furnished 1,265 successful results. Of those vaccinated, 1,977 passed from the observation of medical officers by transfer.

RECRUITING.

The following table shows the record of enlistments and rejections for the year 1896:

Where examined.	Number examined.	Number accepted.	Number rejected.	Color blind.
Receiving ship Wabash, Boston, Mass	550	315	235	17
Receiving ship Vermont, New York, N. Y	3,766	2,167	1,599	48
Receiving ship Richmond, Philadelphia, Pa	1,054	651	403	14
Receiving ship Franklin, Norfolk, Va	403	255	148	6
Receiving ship Independence, Mare Island, Cal	1,469	829	640	61
Marine rendezvous, Boston, Mass	465	285	180	13
Marine rendezvous, New York, N. Y	631	401	230	13
Marine rendezvous, Philadelphia, Pa	416	201	215	10
Marine rendezvous, San Francisco, Cal	436	237	199	15
On cruising vessels and at shore stations other than marine rendezvous and receiving ships	3,301	2,336	965	75
Total	12,491	7,677	4,814	272
RECAPITULATION.				
Receiving ships	7,242	4,217	3,025	146
Marine rendezvous	1,948	1,124	824	51
Cruising vessels and shore stations	3,301	2,336	965	75

Number rejected per 1,000, 385+. Color blind per 1,000, 21+.

INSANE OF THE NAVY.

The number of patients from the Navy and Marine Corps remaining in the Government Hospital for the Insane on June 30, 1896, was 79. During the following year 21 cases were admitted and 20 discharged, 8 as recovered, 1 improved, and 11 dead. On June 30, 1897, 80 (8 officers and 72 seamen and marines) remained in that institution.

NAVAL HOSPITALS.

SUMMARY FOR THE YEAR 1896.

Cases met with in the hospitals appear, as a rule, in the returns from the stations where the disease or injury was contracted. All such cases are indicated in Table XIV (p. 84), in the column "Readmitted," while diseases or injuries first recorded in hospitals appear in the same table in the column "Admitted," and are regarded as original admissions.

NAVAL HOSPITALS, 1896.

Hospitals.*a*	Number of cases under treatment.				Number invalided from service.				Number dead.				Number discharged to duty.				Average number daily under treatment.	Average number of days treatment per case.
	Remaining from last year.	Admitted during the year.		Total.	Diseases.	Injuries.	Total.	Ratio per 1,000 of cases treated.	Diseases.	Injuries.	Total.	Ratio per 1,000 of cases treated.	Diseases.	Injuries.	Total.	Ratio per 1,000 of cases treated.		
		Diseases.	Injuries.															
Portsmouth, N. H.	10	37	14	61	2	...	2	32.79	...	...	...	...	36	14	50	819.67	5.84	35.07
Chelsea, Mass.	18	84	7	109	10	...	10	91.74	3	...	3	27.52	59	7	66	605.50	16.02	53.78
Brooklyn, N. Y. *b*	34	321	41	396	34	10	44	111.11	10	...	10	25.25	173	18	191	482.32	46.85	43.30
Philadelphia, Pa.	37	136	20	193	21	4	25	129.53	5	...	5	25.91	121	17	138	715.03	19.69	37.33
Washington, D. C.	12	121	7	140	6	...	6	42.86	2	...	2	14.29	105	3	108	771.43	13.06	34.14
Norfolk, Va.	44	274	7	325	47	4	51	156.92	8	...	8	24.62	223	5	228	701.54	36.03	40.58
Mare Island, Cal.	32	206	41	279	37	8	45	161.29	3	...	3	10.75	149	23	172	616.49	42.47	55.71
Sitka, Alaska	...	18	4	22	...	...	...	...	...	...	...	...	18	4	22	1,000.00	1.17	19.45
Yokohama, Japan	10	77	4	91	2	...	2	21.98	2	...	2	21.98	64	4	68	747.25	13.72	55.18

a No cases treated at Pensacola hospital during the year.

b Owing to repair of building, 95 cases were transferred to other hospitals, chiefly to Philadelphia.

NAVAL HOSPITALS.

The average number of patients daily under treatment in the various naval hospitals was 194.84, a ratio of 14.15 per 1,000 of force. During the previous year the daily average was 214.63 and the ratio per 1,000 of force 16.94. The average number of days' treatment per case was 47.57 for 1896 and 53.32 for 1895. The deaths numbered 33 and the invalided from service 170, the ratio per 1,000 of cases treated being 22.01 for the former and 113.41 for the latter. The ratios for the previous year were 25.18 and 81.69, respectively.

The diseases most prevalent and the causes of deaths and invaliding are shown in the following detailed statement of the various hospitals.

NAVAL HOSPITAL, PORTSMOUTH, N. H.

(*Statistics.*)

Medical Inspector J. B. Parker, U. S. N., *In charge.*

During 1896 there were 61 cases under treatment, including 10 remaining from the previous year—an increase of 12 when compared with the year 1895. The average number daily under treatment was 5.84; for previous year, 5.55. The average number of days' treatment per case was 35.07; for previous year, 41.33. Of the 51 admissions during the year, 4 were due to bronchitis, 3 each to bronchial catarrh and rheumatism, 2 each to eczema, lymphadenitis, and intermittent fever, and 1 each to senile debility, cephalalgia, epilepsy, paraplegia, nasal catarrh, intestinal catarrh, tonsillitis, broncho-pneumonia, synovitis, and enuresis.

Invaliding.—There were 2 discharges from the service for disability, the causes being chronic nasal catarrh and chronic pleurisy in a case remaining from the previous year. The ratio per 1,000 of all cases under treatment was 32.79; for previous year, 20.41.

Mortality.—There were no deaths. The mortality rate per 1,000 of cases under treatment was for the previous year 40.82.

Venereal diseases.—Five cases of gonorrhea and 2 of primary syphilis were admitted during the year. Two cases of urethral stricture and 1 of cystitis were also treated.

Injuries and poisons.—Under this class 14 cases were admitted, 2 for alcoholism and 12 for injuries (7 wounds, 2 fractures, 2 lacerations, and 1 frostbite).

NAVAL HOSPITAL, CHELSEA, MASS.

(*Statistics.*)

Medical Director J. H. CLARK, U. S. N., *In charge.*

There were 109 cases under treatment during the year, including 18 remaining from 1895, a decrease of 16 when compared with the previous year. The average number of cases daily under treatment was 16.02; for previous year, 19.43. The average number of days' treatment per case was 53.78; for previous year. 56.74. Of the 91 admissions, 10 were due to rheumatism, 9 to malarial fevers, 3 to abscess, 2 each to pneumonic tuberculosis, vaccina, anæmia, tonsillitis, and pleurisy, and 1 each to cerebro-spinal fever, typhoid fever, dementia, epilepsy, simple fever, hemiplegia, neuralgia, neurasthenia, paranoia, iritis, gastric catarrh, hæmorrhoids, pharyngitis, varix, bronchial catarrh, hæmoptysis, arthritis, bursitis, ulcer, and adenoma.

Invaliding.—Ten cases, in the ratio of 91.74 per 1,000 of cases treated, were invalided from service; for the previous year the ratio was 80. The causes were as follows: Pneumonic tuberculosis, 2, and remittent fever, sciatica, gastric catarrh, syphilis, hæmoptysis, bubo, aneurism, and arthritis, 1 each. The case of sciatica remained from the previous year.

Mortality.—There were 3 deaths, 1 each from cerebro-spinal fever, typhoid fever, and pneumonic tuberculosis. The rate per 1,000 of cases under treatment was 27.52; for previous year, 24.

Venereal diseases.—Twelve cases of gonorrhœa, 8 of syphilis, and 2 of chancroid were admitted during the year. There were also treated 2 cases each of bubo, cystitis, epididymitis, and urethral stricture and 1 of gonorrhœal arthritis. One case each of bubo and syphilis were invalided.

Injuries and poisons.—Three local injuries and 4 cases of alcoholism were admitted.

NAVAL HOSPITAL, BROOKLYN, N. Y.

(*Statistics.*)

Medical Director T. N. PENROSE, U. S. N., *In charge.*

During 1896 there were 396 cases under treatment, 362 having been admitted during the year and 34 having remained from the year 1895. The total number of cases treated was 68 less than in the previous year. Of the 362 admissions, 24 were for rheumatism, 17 for typhoid fever, 15 each for pneumonic tuberculosis and malarial fevers, 13 for mumps, 10 for tonsillitis, 9 for pneumonia, 8 for bronchitis, 7 for bronchial catarrh; 6 each for disease of the heart, measles, simple fever, and hæmorrhoids; 5 each for pleurisy and gastric catarrh, 4 each for neurasthenia and anæmia, and 3 each for epidemic catarrh, neuralgia, anal fistula, mania, and melancholia. The average number of cases daily under treatment was 46.85; for previous year, 66.97. The average number of days' treatment per case was 43.30; for previous year, 52.68.

Invaliding.—Forty-four cases were invalided from service, the ratio per 1,000 of cases under treatment being 111.11. The ratio for the previous year was 43.10. The causes of invaliding were as follows: Hernia, 8 cases; pneumonic tuberculosis, 6; mania, 3; hæmorrhoids, cardiac palpitation, melancholia, and dementia, 2 each, and senile debility, hemiplegia, multiple neuritis, locomotor ataxia, amblyopia, asthenopia, retinitis, otitis, gastric catarrh, intestinal catarrh, dyspepsia, cardiac hypertrophy, organic heart disease, bronchitis, cystitis, pyelitis, syphilis, fracture, and alcoholism, 1 each. Six of these cases were transferred to the Government Hospital for the Insane.

Mortality.—There were 10 deaths, 2 each caused by typhoid fever and pneumonia and 1 each by erysipelas, pneumonic tuberculosis, apoplexia, aneurism, syphilis, and carcinoma. The rate per 1,000 of cases under treatment was 25.25; for previous years, 19.40.

Venereal diseases.—Twenty-seven cases of secondary and 2 of primary syphilis and 4 cases each of gonorrhœa and chancroid were admitted during the year, and also 14 cases of bubo, 7 of orchitis, 5 each of cystitis and epididymitis, and 3 each of gonorrhœal arthritis and urethral stricture. One case each of cystitis and syphilis were invalided.

Injuries and poisons.—Thirty-seven local injuries (12 cases of fractures, 9 of hernia, 5 of wounds, 4 of sprain, 3 each of luxation and contusion, and 1 of burn) and 4 cases of poisoning by alcohol were admitted during the year. There were no deaths under this class. Eight cases of hernia and 1 of alcoholism were invalided from service.

NAVAL HOSPITAL, PHILADELPHIA, PA.

(*Statistics.*)

Medical Director D. KINDLEBERGER, U. S. N., and Medical Director G. H. COOKE, U. S. N., *In charge.*

One hundred and fifty-six cases were admitted during the year and 37 remained from 1895, making the total number under treatment 193; a decrease of 27 when compared with the previous year. Of those admitted 13 were for rheumatism, 8 for bronchitis, 7 for malarial fever, 6 for pneumonic tuberculosis, 5 each for epidemic catarrh, mumps, and intestinal catarrh, 4 for typhoid fever, 3 for sciatica, and 2 each for neurasthenia, hæmorrhoids, tonsillitis, and nephritis. The average number daily under treatment was 19.69; previous year, 21.98. The average number of days' treatment per case was 37.33; previous year, 36.46.

Invaliding.—Twenty-five cases were discharged from the service for disability, the ratio per 1,000 cases treated being 129.53; previous year, 122.73. The causes of invaliding were: Pneumonic tuberculosis, 5 cases; fracture, 3; rheumatism, 2; and epilepsy, cholelithiasis, dementia, eczema, pneumonia, monoplegia, multiple sclerosis, hepatitis, cardiac palpitation, laryngitis, necrosis, ostitis, syphilis, hernia, and pleurisy, 1 each.

Mortality.—There were 5 deaths, due 2 each to typhoid fever and nephritis and 1 to hemiplegia (apoplexy). The death rate was 25.91 per 1,000 of cases treated; previous year, 13.64.

Venereal diseases.—Eleven cases of secondary and 1 of primary syphilis, 9 of gonorrhœa, and 5 of chancroid were admitted during the year, and also 10 cases of bubo, 4 of gonorrhœal arthritis, and 1 each of epididymitis and orchitis. One case (syphilis) under this class was invalided from the service.

Injuries and poisons.—There were 18 cases of local injuries admitted and 2 of alcoholic poisoning. The injuries were: Stremma, 5 cases; contusion and fracture, 4 each; burn, 2; and concussion, hernia, and lacerated wound, 1 each. There were no deaths under this class, and 4 cases were invalided from service.

NAVAL HOSPITAL, WASHINGTON, D. C.

(*Statistics.*)

Medical Inspector George A. Bright, U. S. N., *In charge.*

There were 140 cases treated during 1896, of which 128 were admitted during the year and 12 remained from 1895. The number treated was 18 less than that of the previous year. The average number daily under treatment was 13.06; previous year, 15.47. The average number of days' treatment per case was 34.14; previous year, 35.74. Of the cases admitted 16 were for intermittent fever, 10 for remittent fever, 5 for typhoid fever, 4 for tonsillitis, 3 each for mumps, rheumatism, epilepsy, sciatica, appendicitis (1 typhlitis), and bronchitis, and 2 each for pleurisy, eczema, cardiac palpitation, constipation, and malarial cachexia.

Invaliding.—Six cases were invalided from the service, being at the rate of 42.86 per 1,000 of cases treated; previous year, 37.97. The causes were rheumatism, neuritis, epilepsy, cardiac palpitation, bubo, and enuresis, 1 each.

Mortality.—There were 2 deaths—one from broncho-pneumonia and 1 from epithelioma. The rate per 1,000 of cases under treatment was 14.29; previous year, 37.97.

Venereal diseases.—Eighteen cases of gonorrhœa, 8 of secondary and 1 of primary syphilis, and 4 of chancroid were admitted during the year. There were also treated 3 cases of orchitis, and 2 each of bubo and urethral stricture. One case under this class was invalided from service.

Injuries and poisons.—Seven local injuries (fracture, 3; and stremma, hernia, incised wound, and burn, 1 each) were admitted.

NAVAL HOSPITAL, NORFOLK, VA.

(*Statistics.*)

Medical Director C. J. Cleborne, U. S. N., *In charge.*

Three hundred and twenty-five cases were under treatment during 1896, an increase of 17 when compared with the previous year. Two hundred and eighty-one were admitted during the year and 44 remained from 1895. Among those admitted were 24 cases of rheumatism, 17 of remittent fever, 13 of intermittent fever, 12 each of pneumonia and typhoid fever, 6 each of pneumonic tuberculosis, lymphadenitis, and ulcer, 4 each of bronchitis, abscess, and bronchial catarrh, 3 each of dyspepsia, eczema, neurasthenia, and simple fever, and 2 each of malarial cachexia, erysipelas, cephalalgia, anæmia, dementia, mania, heat stroke, conjunctivitis, iritis, otitis, appendicitis, angina pectoris, valvular disease of heart, hæmoptysis, and kidney disease. The average number of cases daily under treatment was 36.03; previous year, 31. The average number of days' treatment, per case, was 40.58; previous year, 36.74.

Invaliding.—Fifty-one cases were invalided from service, being at the rate of 156.92 per 1,000 of cases treated; previous year, 74.68. The causes were: Rheumatism and syphilis, 9 cases each; pneumonic tuberculosis and hernia, 3 each; keratitis and valvular heart disease, 2 each; and dementia, cephalalgia, melancholia, neurasthenia, neuritis, paranoia, lateral sclerosis, vertigo, asthenopia, choroiditis, constipation, hæmorrhoids, hepatitis, angina pectoris, hæmoptysis, pleurisy, eczema, urticaria, cystitis, hæmaturia, nephritis, urethral stricture, and fracture, 1 each. Two of these cases were transferred to the Government Hospital for the Insane.

Mortality.—There were 8 deaths, 3 from pneumonia, 2 from typhoid fever, and 1 each from pneumonic tuberculosis, heat stroke, and nephritis. The ratio per 1,000 of cases treated was 24.62, and for the previous year 25.97.

Venereal diseases.—Twenty-nine cases of secondary and 6 of primary syphilis, 21 of gonorrhœa, and 11 of chancroid were admitted, and also 13 of bubo, 3 each of cystitis and urethral stricture, and 1 each of gonorrhœal arthritis and epididymitis. Under this class 11 cases were invalided.

Injuries and poisons.—Only 6 cases of local injuries were admitted during the year, 2 each of fracture and hernia, and 1 each of luxation and incised wound. There were no cases of alcoholism or of other poisoning.

NAVAL HOSPITAL, MARE ISLAND, CAL.

(*Statistics.*)

Medical Director George W. Woods, U. S. N. *In charge.*

Two hundred and forty-seven cases were admitted during 1896, and 32 remained from 1895, the total number under treatment during the year being 279 cases, an increase of 13 when compared with the previous year. Among those admitted were 13 cases of malarial disease, 11 of rubella, 10 of pneumonia, 9 each of rheumatism and bronchitis, 6 of pneumonic tuberculosis, and 4 of tuberculosis of other parts, 5 each of mumps and eczema, 4 of mania, 3 each of melancholia, conjunctivitis, gastric catarrh, hæmorrhoids, tonsillitis, asthma, bronchial catarrh, pleurisy, synovitis, and nephritis, and 2 each of epidemic catarrh, dysentery, typhoid fever, senile debility, epilepsy, neurasthenia, asthenopia, intestinal catarrh, anal fistula, pharyngitis, varix, ankylosis, arthritis, and ulcer. The average number daily under treatment was 42.47, and for the previous year 46.47. The average number of days' treatment per case was 55.71, and for the previous year 63.76.

Invaliding.—Forty-five cases were invalided from service, the ratio per 1,000 of cases under treatment being 161.29, while that for the previous year was 142.86. The causes of invaliding were: Hernia, 5 cases; pneumonic tuberculosis, 4, and tuberculosis of other parts, 1; mania, 3; asthma, syphilis, and melancholia, 2 each, and alcoholism, varix, bronchitis, pleurisy, ankylosis, rheumatism, thecitis, urinary fistula, gonorrhœa, spermatorrhœa, urethral stricture, fracture, contused wound, dementia, malarial cachexia, senile debility, epilepsy, insomnia, neurasthenia, lateral sclerosis, glaucoma, lacrymal obstruction, surditas, nasal catarrh, gastric catarrh, and heart disease, 1 each. Six of these cases were transferred to the Government Hospital for the Insane.

Mortality.—There were 3 deaths, 1 each from dysentery, chronic intestinal catarrh, and aneurism. The mortality rate per 1,000 of cases under treatment was 10.75, while for the previous year it was 22.56.

Venereal diseases.—Nine cases of secondary and 1 of primary syphilis, 4 of gonorrhœa, and 2 of chancroid were admitted during the year, and also 14 cases of bubo, 4 each of gonorrhœal arthritis and orchitis, 3 of urethral stricture, and 1 of urinary fistula. Six cases were invalided under this class.

Injuries and poisons.—Thirty-eight local injuries and 3 cases of poisoning (alcoholic) were admitted during the year. Among the injuries were 12 cases of fracture, 9 of hernia, 5 of contusion, 4 of sprain, 3 of wounds, and 2 of burn. No death occurred under this class. Eight were invalided from service.

NAVAL HOSPITAL, YOKOHAMA, JAPAN.

(*Statistics.*)

Surgeon Paul Fitzsimons, U. S. N., *In charge.*

Ninety-one cases were under treatment during the year, an increase of 40 when compared with the previous year; 81 were admitted and 10 remained from 1895. Among those admitted were: Remittent fever, 15 cases; intestinal catarrh, 5; rheumatism and pneumonic tuberculosis, 4 each, and intermittent fever, anæmia, neurasthenia, malarial cachexia, gastric catarrh, and eczema, 2 each. The average number of cases daily under treatment was 13.72; for the previous year, 7.62. The average number of days' treatment per case was 55.18; for the previous year, 54.53. Two cases were invalided from service, 1 each for pneumonic tuberculosis and hepatitis. There were 2 deaths, 1 each from typhoid fever and pernicious anæmia. Seven cases of syphilis, 4 of chancroid, and 2 of gonorrhœa were admitted, as also were 3 cases of gonorrhœal arthritis, 2 of urethral stricture, and 1 each of bubo, cystitis, epididymitis, and urinary fistula.

FORCE AFLOAT.

(*Statistics.*)

The average strength of the force afloat during the year 1896 was 10,859. The average number of admissions to the sick list per man on the cruising vessels of the North Atlantic Station was 0.77; on those of the Pacific Station, 0.68; in the South Atlantic squadron, 0.86; in the European squadron, 0.83; in the Asiatic squadron, 0.75; on the Northwestern Lakes, 0.41, and on the receiving ships, 0.72. The ratios for the previous year were 0.99, 0.75, 0.93, 0.83, 0.78, 0.35, and 0.62, respectively.

The admissions for parasites and parasitic diseases were in the ratio of 2.21 per 1,000 (previous year, 2.19); general infectious diseases (non-venereal), 128.46 (previous year, 156.34); constitutional disorders of nutrition, 3.59 (previous year, 3.39); diseases of the nervous system, 66.40 (previous year, 66.72); of the visual apparatus, 9.95 (previous year, 9.56); of the auditory apparatus, 5.16 (previous year, 6.07); of the digestive apparatus, 119.90 (previous year, 129.95); of the circulatory apparatus, 7.18 (previous year, 6.77); of the respiratory apparatus, 60.23 (previous year, 72.79); of the motory apparatus, 34.07 (previous year, 36.15), and of the cutaneous apparatus, 57.28 (previous year, 62.64). The venereal diseases and diseases of the genito-urinary apparatus were in the ratio of 98.44 per 1,000 (previous year, 109.04); cysts and new growths, 1.47 (previous year, 1.39); extraneous bodies, 0.83 (previous year, 0.40); poisons (including alcoholism), 17.59 (previous year, 18.22), and feigned diseases, 0.18 (previous year, 0.40).

The deaths numbered 53, 29 occurring afloat and 24 in hospital, which is in the ratio of 4.88 per 1,000 of force (2.67 afloat and 2.21 in hospital). The death rate for the previous year was 5.77 (3.68 afloat and 2.09 in hospital).

The number invalided from service was 186 (45 from ships and 141 from hospital), the ratio per 1,000 of force being 17.12, and the number transferred to hospital was 884, a ratio of 81.41 per 1,000.

The prevalence of special diseases and the causes of deaths are shown in the following detailed statement of the various stations.

NORTH ATLANTIC STATION.

(*Statistics.*)

There were 24 cruising vessels employed on the North Atlantic Station in the year 1896, viz: Four battle ships, 2 armored cruisers, 4 protected cruisers, 3 monitors, 3 cruisers, 1 harbor-defense ram, 1 gunboat, 1 dispatch boat, 1 sailing ship, 1 transport steamer, 2 surveying vessels, and 1 Fish Commission vessel. The mean force corrected for time was 4,529, and the total number of cases admitted to the sick list was 3,470, being in the ratio of 766.17 per 1,000. The ratio for the previous year was 987.02.

The number invalided from service was 111, a ratio of 24.55 per 1,000 of strength, and the number of deaths was 25, a ratio of 5.52 per 1,000 of strength. The ratios for the previous year were 17.04 and 4.33, respectively. Ninety-one of the discharges for disability were from patients transferred to hospital, where also 15 of the deaths occurred. The number transferred to hospital was 399, a ratio of 88.10 per 1,000 of force, and of 114.99 per 1,000 of admissions. These ratios for the previous year were 109.52 and 110.95, respectively.

The deaths were due, 7 to pneumonia, 6 to typhoid fever, 3 to pneumonic tuberculosis, 2 each to apoplexy, nephritis, and drowning, and 1 each to heat stroke, heart disease, and gunshot wound (suicide). During the year there were admitted to the sick list 280 cases of malarial diseases, 216 of rheumatic affections, 156 of diarrhœal affections, 60 of alcoholism, 37 each of epidemic catarrh and heat stroke, 21 of typhoid fever, 19 of disease of the heart, 18 of pneumonia, 15 of mumps, 13 of pneumonic tuberculosis, 5 of measles, 4 of rubella, and 3 of drowning. Sixty cases of gonorrhœa, 52 of secondary and 11 of primary syphilis, and 35 of chancroid were admitted, as also were 55 cases of bubo, 44 of orchitis, 30 of epididymitis, 11 of cystitis, 9 of gonorrhœal rheumatism, 5 of balanitis, and 17 of urethral stricture.

The most prevalent diseases other than those mentioned were tonsillitis, 219 cases; simple fever, 145; bronchial catarrh, 119; abscess, 114; bronchitis, 111; furuncle, 86; colic, 79; gastric catarrh, 42; neuralgia, 36; pharyngitis, 33; ulcer, 28; hæmorrhoids, 23; otitis and seasickness, 22 each; and constipation, 19. There were 228 cases of wounds, 213 of contusion, 111 of sprain, 36 of burn, 35 of fracture, 19 of abrasion, 16 of hernia, 8 of luxation, and 4 of concussion.

The cases of epidemic catarrh occurred on the *New York* (19), *Essex* (7), *Cincinnati* (3), *Massachusetts* (3), *Columbia* (2), *Montgomery* (2), and *Bancroft* (1). The cases of mumps occurred on the *Brooklyn* (5), *Essex* (5), *Terror* (2), *Cincinnati* (1), *Katahdin* (1), and *Puritan* (1). The cases of measles were returned from the *Terror*, and those of rubella from the *Bache*, *Katahdin*, and *New York*. Five cases of typhoid fever occurred on the *Massachusetts;* 4 each on the *Indiana*, *Bancroft*, and *Maine;* 2 on the *Texas;* and 1 each on the *New York* and *Alliance*. Of the 37 cases of heat prostration, 8 occurred on the *Indiana*, 7 on the *Raleigh*, 4 each on the *Amphitrite* and *Massachusetts*, 3 each on the *Maine* and *Newark*, 2 each on the *New York* and *Cincinnati*, and 1 each on the *Alliance*, *Bache*, *Montgomery*, and *Texas*.

PACIFIC STATION.

(*Statistics.*)

The vessels cruising on the Pacific Station in the year 1896 numbered 15, viz: One battle ship, 2 protected cruisers, 4 cruisers, 2 monitors, 2 gunboats, 3 surveying vessels, and 1 vessel of the Fish Commission. The mean force corrected for time was 1,906, and the total number of admissions to the sick list was 1,289, a ratio of 676.29 per 1,000 of strength. The ratio for the previous year was 750.51.

The number invalided from service was 24, 21 of which were from cases transferred to hospital. The ratio per 1,000 of strength was 12.59 for the year 1896, and for the previous year, 18.95. The number of deaths was 8, 5 of which occurred afloat and 3 in hospital. The death rate was 4.20 per 1,000 of strength; for the previous year, 3.95.

The number transferred to hospital was 152, a ratio of 79.75 per 1,000 of force and 117.92 per 1,000 of admissions. These ratios for the previous year were 87.60 and 116.72, respectively.

The deaths were due, 4 to drowning, and 1 each to angina pectoris, chronic dysentery, aneurism, and chronic intestinal catarrh.

During the year there were admitted to the sick list 65 cases of rheumatic affections, 56 of malarial diseases, 53 of epidemic catarrh, 44 of diarrhœal affections, 25 of alcoholism, 13 of pneumonia, 5 each of pneumonic tuberculosis and drowning, 4 of heat prostration, and 3 each of typhoid fever and disease of the heart. There were 32 cases of gonorrhœa, 14 of chancroid, and 11 of secondary and 3 of primary syphilis. Twenty-six cases of bubo, 21 of orchitis, 9 of epididymitis, 5 of urethral stricture, 3 of gonorrhœal arthritis, and 2 of venereal wart were also admitted. The most prevalent diseases other than those mentioned were bronchitis, 87 cases; simple fever, 62; tonsillitis, 51; abscess, 45; furuncle, 23; bronchial catarrh, 22; conjunctivitis, 21; vaccina and neuralgia, 18 each; gastric catarrh, 14; and cephalalgia and colic, 13 each. There were 118 cases of wounds, 66 of sprain, 53 of contusion, 24 of fracture, 21 of burn, 7 of hernia, 5 of abrasion, 4 of luxation, and 3 of concussion.

The cases of epidemic catarrh occurred on the *Monadnock* (24), *Bennington* (15), *Pinta* (8), and *Monterey* (6). Two cases of typhoid fever were reported from the *Albatross* and 1 from the *Adams*. The cases of heat prostration occurred on the *Alert* (2) and the *Marion* (2).

SOUTH ATLANTIC STATION.

(*Statistics.*)

Three vessels constituted the South Atlantic squadron during the year 1896, viz, 2 cruisers and 1 gunboat. All three vessels were in commission during the entire year, and their average complement was 519. The number of admissions to the sick list was 446, which is in the ratio of 859.34 per 1,000 of mean strength. The ratio for the previous year was 927.99.

The number invalided from service was 11, and the number of deaths 1, the former ratio per 1,000 of strength being 21.19 and the latter 1.93. The ratios for the previous year were 14.73 and 3.27, respectively.

The daily average of patients was 10.56, which is in the ratio of 20.35 per 1,000; ratio for previous year, 24.79. The number transferred to hospital was 27, in the ratio of 52.02 per 1,000 of strength and 60.54 per 1,000 of admissions. The ratios for the previous year were 19.64 and 21.16, respectively.

The death was due to pneumonia.

During the year there were admitted to the sick list 40 cases of rheumatic affections, 10 each of diarrhœal affections and alcoholism, 6 of pneumonic tuberculosis, 5 of malarial disease, 2 each of epidemic catarrh, typhoid fever, pneumonia, and disease of the heart, and 1 of thermic prostration. Fifty-nine cases of gonorrhœa, 22 cases of secondary and 3 of primary syphilis, and 18 of chancroid were admitted, as also were 9 cases of bubo, 6 of orchitis, 5 of epididymitis, 2 of cystitis, and 1 each of balanitis and urethral stricture.

The most prevalent diseases other than those mentioned were: Bronchial catarrh, 30 cases; colic, 16; simple fever, 14; tonsillitis, 13; neuralgia, 12; abscess, 9; and bronchitis, 8. There were 28 cases of contusion, 15 of wounds, 8 of sprain, 7 of fracture, 2 of burn, 1 of luxation, and 1 of hernia.

The two cases of epidemic catarrh occurred on the *Castine* and those of typhoid fever on the *Lancaster*, from which ship was also returned the case of thermic prostration.

EUROPEAN STATION.

(Statistics.)

Three ships constituted the European Squadron during the year 1896, viz, 2 protected cruisers and 1 cruiser. The mean force was 1,044, and the number of admissions to the sick list 866, which is in the ratio of 829.50 per 1,000 of strength. The ratio for the previous year was 831.54.

The number invalided from the service was 5, the ratio being 4.79 per 1,000 of strength. The ratio for the previous year was 8.09. The number of deaths was 4, in the ratio of 3.83 per 1,000. The death rate for the previous year was 9.43 per 1,000.

The deaths were due each to acute miliary tuberculosis, chronic hepatitis, cancer (stomach), and chronic nephritis. Two deaths occurred afloat and two in hospital. The patients transferred to hospital numbered 37.

During the year there were admitted to the sick list 72 cases of rheumatic affections, 44 of malarial diseases, 33 of diarrhœal affections, 29 of epidemic catarrh, 9 of alcoholism, 3 each of pneumonia and thermic prostration, 2 of disease of the heart, and 1 each of pneumonic tuberculosis, chicken-pox, smallpox, and acute miliary tuberculosis. Nineteen cases of secondary and two of primary syphilis, 13 of gonorrhœa, and 7 of chancroid were returned during the year, as also were 31 cases of bubo, 9 of epididymitis, 4 of cystitis, and 3 each of orchitis and urethral stricture. The most prevalent diseases other than those mentioned were: Tonsillitis, 60 cases; simple fever, 38; bronchitis, 29; colic, 26; vaccina, 23; bronchial catarrh and abscess, 22 each; cephalalgia, 19; furuncle, 16; neuralgia and cholera morbus, 15 each; pleurisy, 14; pharyngitis, 11; ulcer, 10; hæmorrhoids, 9, and icterus, paronychia, and cellulitis, 7 each. There were 44 cases of contusion, 36 of sprain, 33 of wounds, 6 of fracture, 5 each of burn and hernia, and 2 each of luxation, concussion, and abrasion.

More than half (25) of the cases of malarial disease occurred on the *Marblehead* with only about one-fifth of the total force, and nearly all the cases (13) of cholera morbus were returned from the same vessel, as also were the only cases (2) of dysentery returned from the squadron. All the cases of epidemic catarrh occurred on the *Minneapolis*, from which were also returned 2 of the 3 cases of pneumonia. The 3 cases of thermic prostration occurred on the *San Francisco*, and also the 1 case each of chicken-pox, smallpox, and acute miliary tuberculosis. The case of smallpox resulted from the stay of the ship at Smyrna, where the disease was prevalent. The whole fleet was exposed more or less to the same influence and the good result was due to the precautionary measures adopted.

ASIATIC STATION.

(*Statistics.*)

The squadron on the Asiatic Station in 1896 was composed of 9 vessels, viz, 2 protected cruisers, 1 partially protected cruiser, 2 cruisers, and 5 gunboats. The mean force was 1,681, and the number of admissions to the sick list was 1,264, a ratio per 1,000 of 751.93. The ratio for the previous year was 778.91.

The number invalided from service was 19, of which 5 were invalided from ships and 14 from hospital. The ratio per 1,000 of strength was 11.30; for the previous year, 6.59. The number of deaths was 8, of which 6 occurred afloat and 2 among patients transferred to naval hospitals. The death rate for 1896 was 4.76 per 1,000 of force, while for the previous year it was 5.99. The number transferred to hospital during the year was 98, being in the ratio of 58.30 per 1,000 of strength and 77.53 per 1,000 of admissions. The ratios for the previous year were 32.95 and 42.31, respectively.

The causes of deaths were: Cholera, aneurism, cholera morbus, broncho-pneumonia, asphyxia (coal gas), drowning, typhoid fever, and pernicious anæmia, 1 each.

During the year there were admitted to the sick list 93 cases of epidemic catarrh, 86 of malarial diseases, 73 of diarrhœal affections, 51 of rheumatic affections, 18 of alcoholism, 6 of pneumonic tuberculosis, 5 each of cholera and heat stroke, 4 of smallpox, 3 each of whooping cough, rubella, and typhoid fever, 2 each of pneumonia, mumps, measles, and heart disease, and 1 of drowning. Forty-nine cases of gonorrhœa, 48 of secondary and 7 of primary syphilis, and 25 of chancroid were admitted, as also were 57 cases of bubo, 41 of epididymitis, 19 of orchitis, 14 of gonorrhœal arthritis, 5 of cystitis, and 4 of urethral stricture. The most prevalent diseases other than those mentioned were bronchial catarrh, 41; simple fever and tonsillitis, 40 each; furuncle, 36; abscess, 28; bronchitis, 20; colic, 17; neuralgia, 14; hæmorrhoids, 10, and gastric catarrh, 9.

There were 74 cases of wounds, 47 of sprain, 19 of contusion, 17 of burn, 14 of fracture, 8 of hernia, and 4 each of abrasion and luxation.

All the cases of epidemic catarrh except 5 occurred on the *Boston* and *Charleston* (p. 49). One case of typhoid fever was returned from the *Machias* and 2 from the *Monocacy*. The cases of pertussis occurred on the *Boston*, as also did the 5 cases of cholera (p. 47). The death from cholera morbus also occurred on that vessel during her visit to Shanghai. One case of rubella was returned from the *Concord* and 2 from the *Petrel*. The latter ship also returned the 2 cases of measles and 1 case of smallpox. The other cases of smallpox appeared, 2 on the *Monocacy* and 1 on the *Charleston* (p. 48). The cases on the *Monocacy* resulted during a long visit to Tientsin, China, while the case on the *Petrel* was acquired at Shanghai. The cases of heat stroke were returned, 3 from the *Boston* and 1 each from the *Monocacy* and *Olympia*.

NORTHWESTERN LAKES.

(*Statistics.*)

There was one vessel, a cruiser, employed on the Northwestern Lakes during the year. The average complement was 93 and the total number of admissions to the sick list was 38, a ratio of 408.60 per 1,000 of force. The ratio for the previous year was 354.84.

There were no deaths, as was also the case in the previous year. The number invalided from service was 2, one each for rheumatism and chronic bronchitis. The ratio per 1,000 of strength was 21.50; for previous year, 10.75.

The daily average of patients was 1.01, a ratio of 10.90 per 1,000; for previous year, 7.85. One case was transferred to hospital, a ratio of 10.75 per 1,000 of force and 26.32 per 1,000 of admissions. The ratios for the previous year were 10.75 and 33.33, respectively.

During the year there were admitted to the sick list 5 cases of rheumatic affections, 3 of diarrhœal affections, 2 of pneumonia, and 1 each of typhoid fever and alcoholism. One case each of secondary syphilis and gonorrhœa were returned, as also were a case each of cystitis and epididymitis. There were 3 cases of contusion, and 1 each of concussion and stremma.

RECEIVING SHIPS.

(*Statistics.*)

These five vessels had a mean complement during the year of 1,087. The total number of admissions to the sick list was 788, a ratio of 724.93 per 1,000, and the daily average of patients was 11.46. The admission rate per 1,000 of strength was 624.90 for the previous year.

The number invalided from service was 14, a ratio of 12.88 per 1,000 of strength, and the number of deaths was 7 (5 occurring afloat and 2 in hospital), the death rate being 6.44. These ratios for the previous year were 14.88 and 12.53, respectively.

The number transferred to hospital was 160, being in the ratio of 147.19 per 1,000 of force and of 203.05 per 1,000 of admissions. These ratios for the previous year were 115.11 and 184.44, respectively.

The deaths were due, 2 each to apoplexy and alcoholism, and 1 each to typhoid fever, erysipelas, and aneurism.

During the year there were admitted to the sick list 69 cases of epidemic catarrh, 68 of malarial diseases, 39 of rheumatic affections, 32 of diarrhœal affections, 29 of alcoholism, 13 of pneumonia, 10 of rubella, 9 of mumps, 3 of typhoid fever, 2 of pneumonic tuberculosis, and 1 of tuberculosis of other parts, and 1 each of measles, scarlatina, and heat stroke. There were 16 cases of gonorrhœa, 11 of secondary and 4 of primary syphilis, and 6 of chancroid. Nine cases of bubo, 6 of epididymitis, and 5 of orchitis, and 1 each of gonorrhœal arthritis, balanitis, cystitis, and venereal wart were also admitted. The most prevalent diseases other than those mentioned were: Vaccina, 64 cases; tonsillitis, 61; bronchitis, 50; simple fever, 21; bronchial catarrh and abscess, 10 each, and colica and pleurisy, 8 each.

There were 33 cases of sprain, 23 of wounds, 18 of contusion, 12 of fracture, 5 of burn, 3 of concussion, and 1 each of hernia and abrasion.

Most of the cases of epidemic catarrh (58) occurred on the *Independence*, on which vessel there were also 1 case of typhoid fever, 5 of mumps, and 10 of rubella. Five cases of epidemic catarrh, 4 of mumps, and 1 each of typhoid fever, heat stroke, measles, and scarlet fever were returned from the *Vermont*. One case of typhoid fever occurred on the *Franklin*, and 5 cases of epidemic catarrh on the *Wabash*.

NAVY-YARDS, MARINE BARRACKS, AND OTHER SHORE STATIONS.

(*Statistics.*)

The various navy-yards and other shore stations had a mean force during the year of 2,665. The total number of admissions to the sick list was 2,422, a ratio of 908.82 per 1,000. The ratio for the previous year was 866.38.

The number invalided from service was 54 (14 from stations and 40 from hospitals), a ratio of 20.26 per 1,000; and the number of deaths was 21 (8 occurring in hospital), the death rate being 7.88 per 1,000. The ratios for the previous year were 23.26 and 12.26, respectively.

The number transferred to hospital was 359, a ratio of 134.71 per 1,000 of force and 148.22 per 1,000 of admissions. The ratios for the previous year were 132.35 and 152.76, respectively.

The deaths were due, 3 each to apoplexy and pneumonia, 2 to pneumonic tuberculosis, and 1 each to cerebro-spinal fever, typhoid fever, syphilis, epithelioma, broncho-pneumonia, drowning, alcoholism, angina pectoris, septicæmia, intestinal obstruction, osteoma, spinal luxation, and an undetermined cause.

During the year there were admitted to the sick list 307 cases of malarial diseases, 116 of epidemic catarrh, 115 of diarrhœal affections, 89 of rheumatic affections, 49 of alcoholism, 11 each of pneumonia and disease of the heart, 9 of pneumonic tuberculosis and 2 of tuberculosis of other parts, 8 each of typhoid fever and thermic prostration, 7 of measles, 5 of mumps, 2 of scarlet fever, and 1 each of chicken-pox, cerebro-spinal fever, and drowning. There were 70 cases of gonorrhœa, 26 of chancroid, 19 of secondary and 10 of primary syphilis, 13 of bubo, 7 of cystitis, 6 of urethral stricture, 5 of orchitis, 3 of epididymitis, and 2 each of balanitis and venereal wart. The most prevalent diseases other than those mentioned were: Tonsillitis, 150 cases; bronchial catarrh, 134; cephalagia, 80; bronchitis, 73; abscess, 59; pharyngitis, 47; colic, 44; nasal catarrh, 38; furuncle, 34; simple fevers, 32; neuralgia, 23; constipation, 20; cholera morbus, 19; gastric catarrh, 17; neurasthenia and conjunctivitis, 15 each; laryngitis, eczema, and odontalgia, 10 each; sciatica, 9, and pleurisy, 8.

There were 102 cases each of wounds and sprain, 62 of contusion, 32 of fracture, 10 each of abrasion and hernia, 7 of burn, 5 of luxation, 3 of concussion, and 1 of frostbite.

Nearly one-half (140) of the malarial diseases occurred at Washington, D. C., 105 cases having been returned from the Washington Navy-Yard, 27 from the Marine Headquarters, and 8 from those on special duty in Washington City. Fifty-one cases of that disease also occurred at the Newport Station, chiefly in persons who had been exposed to the poison at the Washington Navy-Yard. Two cases of typhoid fever were returned from the Newport Station and the same number from the Philadelphia yard, while at the Naval Academy, New York yard, Marine Headquarters, and Norfolk there was 1 case each. The cases of epidemic catarrh developed chiefly at the Naval Academy (67), Mare Island yard (21), and Newport Station (12). Three cases of measles occurred at the Washington yard, 2 among persons on special duty in Washington City, and 1 each at the Naval Academy and New York yard. The case of cerebro-spinal fever was returned from the Boston yard, and those of scarlatina were returned 1 each from the Newport Station and the Naval Academy, where also the case of varicella occurred. Three cases of mumps developed at the Marine Headquarters and 2 at the Pensacola yard.

SELECTED MEDICAL, SURGICAL, AND SANITARY NOTES FROM SHIPS, SHORE STATIONS, AND HOSPITALS.

SHIPS.

U. S. S. ADAMS.

(Note.)

G. TUCKER SMITH, *Passed Assistant Surgeon.*

Vulnus punctum.—On July 4 an ordinary seaman was stabbed in a brawl at Honolulu. He was carried to the office of a civilian practitioner, where I arrived soon afterwards. An examination disclosed a small wound in the left lumbar region through which about 3 inches of omentum protruded. After consultation, I ligated and removed the protruding omentum, enlarged the wound in the direction of the fibers of the external oblique muscle, and placed the stump within the abdomen. As there were no signs of intestinal perforation, the wound was closed with buried and superficial catgut sutures and sealed with collodion impregnated with iodoform. An ample dressing was applied and the patient removed to the Queen's Hospital, where he made an uneventful recovery.

Vulnus sclopeticum.—During the forenoon of December 12, as the ship was getting underway, a quartermaster, third class, attempted suicide by shooting himself through the chest with a service rifle. The projectile entered above the right nipple between the third and fourth ribs and traversing the chest made its exit just below the spine of the scapula. The shock was not severe and at first the hæmorrhage was slight, but during the night, after transfer to the Queen's Hospital, Honolulu, there was severe bleeding from the wounds of entrance and exit and from the mouth. The patient, however, made an uninterrupted recovery, and was returned to duty after fifty-eight days.

U. S. S. ALLIANCE.

(Note.)

JAMES F. LEYS, *Assistant Surgeon.*

Febris remittens.—The ship arrived at Key West on April 2, leaving on April 25. The visit was responsible for 14 cases of continued fever, several of an aggravated type, not corresponding to denguis, but not yielding satisfactorily to large doses of quinine in solution. The same fever prevails extensively in the town and garrison every summer. Most sojourners are attacked during their first season and are apt to escape thereafter.

Vulnus punctum.—In a case of punctured wound, it became necessary on April 20 to enucleate the bursa over the right olecranon. This was done antiseptically and the result was entirely satisfactory, the patient returning to duty six days after operation.

U. S. S. BENNINGTON.

(*Note.*)

JOHN W. BAKER, *Passed Assistant Surgeon.*

Venenum irritans.—On August 12, when coaling ship at San Francisco, a coal passer was approached by two of his shipmates who offered him a drink. He retired to a secluded passageway where the light was poor, and drank from a glass flask. The liquid proved to be ammonia colored with caramel. Only one mouthful was taken, and most of that was spasmodically rejected. As a result of this practical joke, a large eschar formed over the surface of the tongue, the lips, and epiglottis. A dilute acid mixture was employed immediately after the accident, and under diluents, emollients, and liquid nourishment there was a rapid recovery.

Chondroma.—A second-class fireman gave the following history: While serving in the Army sixteen years ago he was shot in the left ankle. The bullet was never found. Some years after a small lump made its appearance near the ankle joint, and caused pain when in contact with the shoe. The lump moved about and he consulted a civil practitioner, who thought it was the bullet, but advised against interference. The lump was midway between the malleoli on the anterior surface of the tibia and directly beneath the integument. It was oblong with the greater diameter across the leg and was slightly movable, hard, and quite painful. As it interfered with the performance of his duties, it was cut down upon and proved to be a chondroma.

Vaccina.—The entire crew was vaccinated during the year, and cases were noted showing the typical umbilicated pustules such as are ordinarily seen only in infancy. Among 7 men who had had smallpox, 2 successful results were obtained, one having had the disease when 3 years of age. In this connection, the remarks of Dr. J. J. Matignon, who studied the subject in northern China, are interesting. After vaccinating successfully a number of children who bore unmistakable scars of smallpox, he drew the following conclusion:

In China variola confers only a temporary immunity against vaccination, its duration varying from seven to nine years. It is necessary for Europeans living in Peking, where the disease is endemic, who have had variola to be revaccinated after a time (Bulletin Général Therapeutique 1896, 7e livre, p. 314).

U. S. S. BOSTON.

(*Note.*)

M. H. CRAWFORD, *Surgeon.*

Cholera.—Cholera made its first appearance for the year in Shanghai, China, on August 20, in the case of a negro sailor who had been discharged from the merchant service six months previously, since which time he had resided in the Hongque settlement. He expired twenty hours after admission to the general hospital. The next case was that of a woman, aged 41 years, and a native of England, who had lived in Shanghai for fifteen years and kept a boarding house and barroom in the same settlement. She had been sick for two days, was admitted to the general hospital in a state of collapse on August 23, and died on August 24; the second officer of a Chinese merchant steamer was admitted with cholera to the same hospital. He returned to duty September 10. No more cases of the disease were reported in Shanghai until September 7, when 2 merchant sailors were attacked. They died on the second day after admission On the ship on which one of these cases occurred 2 others appeared, and on September 9 and September 12, 3 other cases were admitted to the general hospital from vessels in the harbor.

The health reports of Shanghai show that cholera has appeared there annually during the summer months of the past twenty-five years.

It was on September 12 that the *Boston* sailed from Shanghai, too late to escape the influence of the conditions on shore. On the evening of September 5 a coal passer applied for treatment, complaining of a mild diarrhœa; on the 7th he was transferred to the general hospital, where he died of cholera on the 10th. This man had been granted liberty on the afternoon of September 3, and had passed the night in the Hongque settlement. He returned from liberty on the afternoon of the 4th and applied for treatment the next evening. All of his effects were burned, and the two forward berth decks, including sick bay, dispensary, brig, pay office, forward holds, and water-closets, were fumigated with sulphur dioxide. Berth decks were washed with bichloride solution 1–500, and hammocks and clothing were aired when weather permitted.

On September 14 the ship sailed from Woosung, and while at sea on the 15th a second-class fireman was admitted to the sick list with cholera. He was transferred to the hospital at Chefoo on the 17th, where he recovered. This man had not been out of the ship since August 15.

On the 18th another case occurred, and 2 on the 19th. These cases were immediately transferred to hospital on shore. They all recovered. All of the compartments forward of the junior officers' quarters were fumigated with sulphur dioxide and washed with bichloride and carbolic-acid solutions. All water in tanks was pumped out. The tanks were thoroughly cleaned and disinfected before they were again filled with distilled water. Clothing and other soiled articles were carefully disinfected. No other cases have occurred.

U. S. S. CHARLESTON.

(*Note.*)

C. U. Gravatt, *Surgeon.*

Variola.—On March 1 a machinist reported with an eruption on the forehead, cheeks, wrists, and hands, and decided constitutional disturbance following a chill during the night. He had been ashore at Nagasaki, Japan, from February 16 to 22. He was promptly isolated, and as soon as accommodations could be given was transferred to the Nagasaki civil hospital. This was on the 4th, when only two papules showed vesiculation. From that time the eruption receded without passing through the characteristic changes. This modification may be accounted for by a successful vaccination sixteen months previously.

Catarrhus epidemicus.—The ship remained at Nagasaki, Japan, from May 5, 1895, until March 12, 1896. Epidemic catarrh prevailed on shore to some extent and sporadic cases occurred on board during the winter months. On March 11 a sudden outbreak appeared on board and 12 men were admitted to the sick list. On the next day 6 cases were admitted and by the end of the month 29 more. In addition to those, 20 cases were treated without admission, a total of 67.

The symptoms were the same in nearly all the cases: A chill followed by a temperature of 101°–102° F., severe frontal headache, distressing muscular pains, and pronounced depression. Frequently occipital pain and vertigo were also complained of. Harsh painful cough soon developed. The expectoration was scant but very irritating, violent paroxysm of coughing being exerted to dislodge small quantities of mucus. Intestinal catarrh complicated a number of cases. Rheumatism followed in one and neurasthenia in several. In one of the latter bradycardia was a noticeable symptom.

Quinine, arsenic, and strychnia in capsules were used in the treatment. Inhalations of eucalyptol benefited the cough more than anything else.

U. S. S. CASTINE.

(*Note.*)

G. B. WILSON, *Passed Assistant Surgeon.*

Syphilis consecutiva.—Two apprentice boys, aged 17 years, were tattooed on the left forearms while visiting an English merchant steamer at Buenos Ayres on June 7. A chancre appeared on each arm, and was followed by the usual constitutional symptoms. One was transferred to hospital on November 17, after having been under observation for more than a month, and the other on December 14.

U. S. S. COLUMBIA.

(*Note.*)

C. A. SIEGFRIED, *Surgeon.*

Urethræ strictura.—A second-class fireman, who had had gonorrhœa in June, 1895, was admitted on February 29, with two strictures, one (27 F.) an inch and the other (21 F.) 2½ inches from meatus. They were both divided with an Otis urethretome to 34 F. The hæmorrhage was slight. Quinine, salol, and acetate of potassium were administered. There were no constitutional symptoms, and after one week on the sick list the patient was returned to duty.

U. S. T. S. CONSTELLATION.

(*Note.*)

F. J. B. CORDEIRO, *Passed Assistant Surgeon.*

Sarcoma.—On September 8 a coal passer, 24 years old, was admitted as with periostitis. Eventually a large tumor developed on the head of the left tibia. A microscopic examination showed the disease to be sarcoma, and on November 2 the thigh was amputated at the lower third. The tumor was a large gelatinous mass, which had caused absorption of much of the bone. The patient remained on the sick list until December 15, when his enlistment expired, and was ultimately supplied with an artificial leg.

U. S. S. DOLPHIN.

(*Note.*)

FRANK ANDERSON, *Surgeon.*

Apoplexia.—The apothecary, aged 35 years, died at sea on March 1 at 8.15 a. m. He had been in his usual health the previous day, and soon after "all hands" on the morning of his death was seen lying in his bunk, sleeping naturally, by the bayman. Later he was found on the floor unconscious. Pupils were normal and pulse full and regular with a rate of 66. There was a slight paresis noticeable on one side of the face, but no paralysis of any of the extremities. Cyanosis was marked, especially at base of neck and below clavicles. A small wound over left parietal eminence had resulted from the fall on deck. There were momentary approaches to consciousness, marked by lifting the head, placing the hand to back of neck, and groaning. The pulse continued strong and regular for a perceptible time after respiration ceased.

The necropsy disclosed no disease of the organs in the abdominal and thoracic cavities. There was an old scar in the scalp about 3 inches in length and crossing the median line on the top of the head. The dura mater was found adherent to the brain in two spots corresponding to the location of the scar and to the left of the longitudinal fissure. Fibrous tissue had developed at these spots, resulting in destruction of the normal texture of the dura mater. This newly formed tissue formed an elevation, which had produced absorption of the superjacent bone. There was a place in the left parietal bone about as large as a penny which was almost as thin as a sheet of paper. A clot of blood surrounded the medulla oblongata and completely filled the space between it and the surrounding bone. This clot was closely adherent to the pia mater, and probably escaped from the vessels of that membrane. The hæmorrhage consisted of about a dram and a half. There was no laceration of brain tissue.

U. S. S. ESSEX.

(*Note.*)

H. B. Fitts, *Passed Assistant Surgeon.*

Vulnus laceratum.—On May 27 a Japanese mess attendant, aged 28 years, was struck in the left eye with the bare fist of another servant. The ball was ruptured, and the lens and vitreous humor immediately escaped, hanging down in a mass on the face. The shock was severe, and continued in less degree for an hour or more. A good recovery, with loss of sight, was made under antiseptic precautions, though there was more or less constant pain for several weeks. He was not discharged to duty until August 21.

Tonsillitis.—This disease and pharyngitis have been prevalent on board ever since the ship was commissioned. During the year there have been 45 cases and 203 sick days. The trouble is confined to the berth deck, and prevails most during warm, moist weather, especially in the Tropics. It is attributed to the crowded condition of the ship and the impossibility of securing proper ventilation while at sea. A few days of thorough airing of bedding and of opening air ports (which can be done only in port in smooth weather) generally suffices to suppress or abate the disease. It is hoped that the construction of a spar deck, now contemplated, will, by providing increased berthing space, operate to remedy this trouble.

U. S. S. INDIANA.

(*Note.*)

G. P. Bradley, *Surgeon.*

Fractura.—On October 13, during a gale, and while the ship was at sea, a steerage officer sustained a compound comminuted fracture of both bones of left leg. The injury was caused by the heavy armor door of steerage mess room, which, swinging to and fro with the motions of the ship, closed on the leg, crushing bones and soft parts for 3 inches in middle third. Owing to the excessive rolling of the ship, temporary antiseptic dressings, including splint, were applied. On arriving in port the case was transferred to civil hospital, where amputation was performed. The stump healed by first intention.

Vulnus sclopeticum.—A seaman, aged 26, native of Ireland, who had apparently been in good health, and who was without history of mental depression, was found in the bag room dead. There was a gunshot wound of head, which had evidently been inflicted by himself with a revolver.

U. S. S. LANCASTER.

(*Note.*)

C. G. Herndon, *Surgeon.*

Scorbutus.—This disease, now so exceedingly rare in the service, occurred in a seaman 25 years of age, who had been recently enlisted on the South Atlantic Station, and who had a history of shipwreck and of two attacks of scurvy while in the merchant service. His symptoms were sore and swollen gums, loose teeth, foul breath, "muddy complexion," and general anæmia. His teeth became very loose and face much swollen. The day after admission there was severe facial neuralgia, and the condition of the mouth prevented mastication. The treatment was principally lemon juice, a diet of fresh vegetables, and a suitable mouth wash. He responded rapidly, as his admission to the sick list was on April 21 and he was discharged to duty on April 29. That the tendency to this disease should have become apparent under present conditions of service is worthy of notice. This man on May 28 was admitted with febris enterica, which ran a typical course, with the exception of diarrhœal symptoms, and ended in recovery after the usual time. This case, and another admitted on April 1, which also recovered, could not be traced to any source, as the men had not been ashore for many weeks prior to illness, and no water from shore had been used for drinking purposes. These were the only cases of the disease during the year.

Gonorrhœa.—On July 23 a corporal of marines, aged 30, was admitted with gonorrhœa complicated by marked inflammation of Cowper's glands, which ultimately suppurated. The amount of pus was so large that it became necessary to evacuate by incision. A urinary fistula followed, but under appropriate treatment this healed. The patient was discharged to duty on August 17 and was soon entirely well.

U. S. S. MARBLEHEAD.

(*Note.*)

EDWARD H. GREEN, *Surgeon.*

Vulnus sclopeticum.—A gunner's mate, aged 23 years, while acting as marker at target practice on shore on June 15, was struck in left thigh by a fragment of bullet. He was standing about 20 yards from the target and thought he was screened by a wall. A jagged piece of lead weighing 40 grains entered thigh just below Scarpa's triangle and penetrated to the depth of an inch and across the thigh for 2 inches. The bullet was cut down upon and removed. On account of the laceration the wound was treated as an open one. It healed without constitutional disturbance.

U. S. S. MASSACHUSETTS.

(*Note.*)

C. A. SIEGFRIED, *Surgeon.*

Febris enterica.—This ship was commissioned at the League Island yard on June 10, but for several weeks after that date as many as 150 workmen from Cramp's shipyard were on board daily. The Schuylkill joins the Delaware River near by and the sewage-polluted water of both streams washes the shores of the station on all sides. It was warm weather, and the environment of the station is insanitary to a marked degree. For a few weeks no unusual disease was noted, but after that time febrile cases of a simple or malarial character were frequent. Forty-two days after going in commission the first case of typhoid fever appeared. This was followed by four in quick succession, the five cases occurring within a period of six weeks. The ship left the Delaware on August 5, and there was no case of the disease on board after August 31. This makes it clear that the cause of the disease was localized in the environment at Philadelphia and that the men were not infected at other stations before joining the ship. It is impossible to say whether the disease germs came aboard in the milk or fresh vegetables or from the water alongside, which was probably sometimes used by the men. Three of the cases belonged to one mess. The men had more or less liberty on shore. The percentage of the men affected was 1.25. The disease was of virulent type and three of the five cases died in hospital.

U. S. S. MINNEAPOLIS.

(*Note.*)

D. N. BERTOLETTE, *Surgeon.*

Appendicitis.—A seaman, aged 25 years and 8 months, was admitted on June 27 with appendicitis. On February 1 the abdomen was entered through a curved incision 3½ inches long, nearly parallel with Poupart's ligament and with the convexity toward and 1 inch from the anterior spine. The abscess, which was entirely separated from the general peritoneal cavity, was opened and 2 ounces of thick pus evacuated. Owing to adhesions it was not deemed advisable to search for the appendix. The cavity was well washed and then packed with iodoform gauze.

Three days after operation, while dressing the wound, a gangrenous spot was discovered, from which flatus and liquid fæces issued. Later, at the bottom of the cavity there was found a hard, dry, bean-shaped mass, which was probably the concretion from the interior of the appendix. The general condition of the patient continued good; the cavity filled, the fistula slowly closed, and on May 1 he was discharged to duty.

U. S. S. MONOCACY.

(*Note.*)

N. J. BLACKWOOD, *Passed Assistant Surgeon.*

Meningitis.—An officer, aged 27 years and 9 months, who had had several attacks of rheumatism, which had left him with an aortic murmur, acted, after exposure to the sun, in a peculiar manner, saying and doing things quite foreign to his nature. These symptoms disappeared gradually under simple treatment. Three months later, on August 29, he fell off his chair in convulsions, which lasted ten minutes or more. He remained in bed until September 10, during which time he passed through various stages of unconsciousness, from coma to a busy but quiet delirium, and had a range of temperature from 100° to 105° F. There also now appeared a mitral murmur and the signs of pericarditis. On September 10 all the symptoms began to abate, and on the 30th he was transferred to hospital at Yokohama, where he continued to improve. He was ultimately transferred home, where he was retired from service on account of heart disease.

U. S. S. OLYMPIA.

(Note.)

J. G. AYERS, *Medical Inspector.*

Febris remittens.—The ship remained at Woosung, China, from March 4 to May 9, except the short time at Side Saddle Islands for target practice. The visit was responsible for 24 cases of remittent fever that appeared on board. The type was not very acute, but the disease was very persistent, lasting more than a month in some cases and followed by slow convalescence. Quinine, 3 grams or more daily, and Warburg's tincture were the principal remedies employed. The country about Woosung is low and to some extent marshy, and the disease resulted from the miasmatic influences of that region.

Cholera.—During the latter part of June cholera again appeared in Japan, and from June 24 to July 3, 46 cases were reported throughout the Empire, with 7 deaths. There was also an unusual amount of smallpox for that season, as 79 cases and 25 deaths had occurred during the same period. Relapsing fever was steadily increasing and affecting a large area.

Aneurysma.—A first-class musician, aged 39 years, died suddenly on the morning of September 13, just after returning on board from liberty. The necropsy disclosed an unruptured aneurism of the arch of the aorta about 1¾ inches in diameter, which extended nearly to the heart and involved a small part of the descending aorta. There were also thrombi of the right ventricle, one extending into the pulmonary artery, and much pulmonary engorgement.

Asphyxia.—A boatswain's mate, second class, aged 42 years, of temperate habits, was ashore on liberty at Yokohama, Japan, on October 3. About 8 p. m. he entered his room at the Central Hotel, apparently sober, and was found at 1.30 a. m. unconscious, with the room filled with coal gas. All attempts at resuscitation failed, and he died at 1 p. m. of the same day.

U. S. S. "OREGON."

(Note.)

P. A. LOVERING, *Surgeon.*

Bronchitis acuta.—Forty-two cases of the disease occurred during the third quarter of the year and furnished more than one-third of all the sick days. Many of the cases were severe. They occurred almost entirely among men under 30 who were unaccustomed to ship life and were in need of advice as to clothing and the avoidance of unnecessary exposure.

Fracturæ.—A seaman was struck on the head with a heavy scrubbing brush on October 24. He presented symptoms pointing strongly to fracture of the base of the skull, as there was marked bleeding from the ear and nose. As the ship was under sailing orders, he was transferred to civil hospital, where an incision was made at the seat of the blow on left side of head, but no fracture was discovered. He was delirious and required constant restraint for two weeks, when he began to improve, but with left facial paralysis and marked mental enfeeblement. On November 14 he was transferred to Mare Island Hospital, where he remained at the end of the year.

A case of fracture of right patella is recorded in a robust man, 23 years old, who, while coming down a ladder, took two steps instead of one, and felt his kneecap give way. There was only moderate separation of fragments, and good apposition was obtained by ordinary means.

U. S. S. RALEIGH.

(*Note.*)

HENRY G. BEYER, *Surgeon.*

Neuritis multiplex.—A carpenter, aged 56 years and 2 months, who had a long history of malarial cachexia, was admitted, on September 28, with severe pain in left lumbar region, radiating forward and downward to the front of the abdomen. He also complained of inability at times to freely control the movements of right leg, climbing the ship's ladders with difficulty. There was also at times a peculiar jerky feeling in the same leg. An examination showed heart and lungs normal; functions of bowels and bladder unimpaired; urine normal; patellar, plantar, and crural reflexes exaggerated on right side more than on the left; and partial anæsthesia over entire right lower extremity, sharp points feeling to him like the ends of the fingers. There was incomplete analgesia over the same area except the sole of the foot, as a needle transfixing the skin was not felt. Temperature sense was also completely lost. The reactions of left leg were normal, except that they seemed somewhat delayed. There was apparently no loss of crude muscular power in either leg. There was absence of Westphal's, Romberg's, and Argyll-Robertson's symptoms. All the special senses were undisturbed, and there were no signs of vaso-motor disturbance. He was transferred to hospital at New York on September 30, where an irritability of bladder developed, but other symptoms improved. He was retired from active service on November 13.

Adenoma.—Three operations were performed during the third quarter for the removal of adenomas. One patient presented a tumor as large as a small orange on the back of neck. In the others the tumors were smaller, one near the right and the other near the left ear. Two were removed under ether and one under cocaine. The best results were obtained in all.

Ulcus.—A coal passer aged 31 years was admitted on November 13 with an ulcer covering the internal malleolus. The condition followed an injury from striking an anvil several weeks prior to admission. There was considerable pain on walking and much œdema of surrounding tissues. By December 3, in spite of treatment, the ulcer was as large as the hand. On December 7, under ether, an incision 3 inches long was made over the malleolus down to the bone, the periosteum was pushed aside, and a small cavity exposed containing a dark gelatinous mass mixed with bony detritus. The cavity was chiseled free from dead bone and the wound, only partially closed, was treated antiseptically. The patient remained under treatment at the end of the year, with the wound filling rapidly with healthy granulations.

U. S. S. THETIS.

(*Note.*)

STEPHEN S. WHITE, *Passed Assistant Surgeon.*

Fractura.—While this ship was lying at anchor in the harbor of San Jose, Lower California, a man attached to a vessel of the Pacific Steamship Company was caught in the anchor engine of that vessel and sustained a compound comminuted fracture of right forearm, and a lacerated wound of the muscles covering the hip joint. I administered chloroform, and, assisted by the apothecary and two men from deck, amputated the forearm in the middle third by the circular flap operation. The patient having been transferred to this ship, I redressed the stump after an interval of ten days, as there had been no rise of temperature indicating interference. The man was transferred to the marine hospital at San Francisco on the arrival of the ship at San Diego, December 21.

SHORE STATIONS.

NAVAL ACADEMY.

(*Note.*)

T. C. WALTON, *Medical Director.*

Febris pneumonica.—A cadet aged 18 years was admitted to the sick list on April 6 with a furuncle on back of neck, which caused considerable pain on motion. On the next day, after a restless night, he felt faint in the morning and vomited. There were chilly sensations, a temperature of 104.8° F., and pulse of 130. The boil gave no evidences of suppuration. There was no cough. In the evening the temperature was 105° F., dyspnœa was apparent, and there was crepitation over lower lobe of left lung. On the next day there were evidences of consolidation of lower half of each lung, and friction sounds over pericardium and right pleura. Temperature was 101.3° to 102.6° F., pulse from 130 to 150, and respiration from 40 to 72. No cough or catarrhal symptoms appeared at any time. The treatment had been strychnia, ammonia, whisky in full doses, and counter irritation. Death occurred at 6.56 p. m. The weather had been cold and damp for several days, and a mild epidemic of grippe was prevailing at the Academy. The absence of cough, pain, and expectoration and the insidious development of disease in this case are worthy of note. There was no necropsy.

Luxatio spinalis.—On the morning of September 1 a sergeant of marines lost his balance and fell down the main hatch of the U. S. S. *Monongahela*, a distance of 18 feet, striking the hatch bar about the middle of his back. He suffered from concussion, shock, and complete paralysis below the seventh dorsal vertebra. During his illness the urine was drawn every four hours, and there were involuntary evacuations from the bowels. On September 8 the temperature suddenly reached 104.2° F., and after three hours fell to 97.5° without medication. The pulse was 130, but after one-fifteenth gr. of strych.

sulph. had been administered hypodermically it became 80 and the temperature normal. On September 9 a large quantity of pus appeared in the urine and continued until his death. He lost strength daily, his stomach refusing food and rectal injections not being utilized. Death occurred on September 16. The necropsy showed all the abdominal viscera covered with recent lymph and a blood clot weighing about 12 ounces in the cavity. The right kidney was an encapsulated abscess. The seventh dorsal vertebra was displaced five-eighths of an inch forward and to the left, compressing the cord.

PORT ROYAL STATION.

(*Note.*)

T. A. Berryhill, *Passed Assistant Surgeon.*

Abscessus.—A sergeant of marines, aged 33 years and 8 months, reported for treatment on November 23. He presented a swelling to the right of the anus and complained of severe pain. The temperature was 101° F. A quantity of fœtid pus was withdrawn by aspiration. The next day the swelling had increased and involved the scrotum, and the temperature was 105° F. A free incision was made one inch to the right of the anus, and a large quantity of fœtid pus evacuated. The cavity was washed out and a drainage tube inserted. The swelling, however, continued to extend, and he died of pyæmia on November 25. The necropsy showed a deep-seated abscess of the perineum, apparently unconnected with rectum or urethra.

HOSPITALS.

NAVAL HOSPITAL, CHELSEA, MASS.

(*Note.*)

J. H. Clark, *Medical Director.*

Necrosis.—On August 25 of previous year, this patient, a seaman, 31 years of age, was admitted with syphilis of some months' duration. The disease was very apparent, the body being extensively covered with pustular eruptions, forming crusts. He complained of considerable pain over left clavicle and tibia. The usual treatment was employed and included simple and mixed medication by the mouth and inunctions. The ecthyma required local treatment. A large ulcer formed on left arm, sore throat developed from time to time, and night pains were very severe, the last at times demanding morphia for relief. He gradually improved, but, in spite of persistent treatment, "bone pains" were prominent from time to time, especially in left tibia, though both arms and legs were affected. On May 31 there were pain and some swelling just below tubercle of left tibia, which continued without much change until July 24, when an abscess formed, and an incision was made. As the signs of necrosis soon became apparent, on August 9 an incision was made, under ether, over the diseased area, disclosing a necrosis of the tibia from the tuberosity for 2 inches along the crest and extending for a short distance along the outer and inner sides of the bone. The diseased tissue was removed and the wound packed and dressed antiseptically. The wound was not completely healed until October 21. Constitutional treatment had been continued, and the patient was discharged to duty on November 30, having been subsisted for four hundred and sixty days.

Adenoma.—A private marine, aged 30 years, was admitted on July 31 with an enlargement of left breast, due to a rather dense, lobulated, and freely movable tumor. Patient was etherized and the left mammary gland, with the inclosed tumor, removed. The axillary glands did not show any enlargement. He was discharged to duty, well, on September 14.

NAVAL HOSPITAL, BROOKLYN, N. Y.

(*Note.*)

THOMAS N. PENROSE, *Medical Director.*

Febris pneumonica.—An apprentice, aged 19 years, was seized with severe abdominal pain, accompanied by vomiting, on the evening of October 29, and that night had a chill. On the following day he complained of pain in right side extending to the shoulder. His temperature was 103° F., and there were the signs of pneumonia on that side. The abdominal pain did not disappear until October 31, when he was transferred from his ship to this hospital. On November 3 sputum was characteristic, but scanty. Only a small portion of lower lobe of right lung seemed to be involved. On November 10 he complained of tenderness on pressure in right iliac region. Up to that time he seemed to be doing well. Sputum was copious and rusty. During that afternoon he became much worse, respirations increased to 40, and pulse rate was 140. Expectoration was mucopurulent, very offensive, and very copious, suggesting the discharge of abscess. He died at 8.30 p. m., November 10, about fourteen days after seizure. *Necropsy.*—Pericardial fluid in excess; lower lobe right lung in state of red hepatization, pleural adhesions; general peritonitis, pus sacs, and adhesions throughout abdominal cavity, the largest collection of pus being between right lobe of liver and diaphragm, and communicating, through perforation of diaphragm and lung, with bronchi. The affection was believed to be tubercular.

Aneurysma.—A mess attendant, native of Japan, and aged 30 years and 4 months, was transferred to this hospital on March 6 with history of bronchial catarrh, for which he had been treated in February and again very recently. His attacks were associated with cough, expectoration, general malaise, and mild fever. His ignorance of English made it difficult to obtain any account of his symptoms. When he arrived at hospital there seemed to be a greatly increased flow of saliva, and there were pain and soreness in region of stomach. Pulse was normal and temperature was nearly so. An examination of the chest revealed nothing abnormal. The stomach was irritable, breath foul, tongue slightly coated, and there was tendency to constipation. His stomach continued irritable, and there was little appetite in spite of treatment. He frequently complained of obscure pains in the epigastrium and chest. On April 4 a little blood appeared in the abundant expectoration, but the origin could not be traced. The tendency to vomiting disappeared and the appetite improved. Repeated examinations of the chest gave no information, but he discharged from the mouth a considerable amount of watery mucus. During May he coughed a good deal at night and complained at times of severe pain in chest and in back between scapulæ. On May 15, at 2.30 a. m., there was a severe hæmorrhage from the mouth. The blood was bright in color. About 6 a. m. another hæmorrhage occurred in very large quantities, and caused death. The necropsy revealed an aneurism of the thoracic aorta of considerable size, which had ruptured into the trachea. The heart was normal and the lungs showed signs of previous congestion.

NAVAL HOSPITAL, PHILADELPHIA, PA.

(*Note.*)

D. Kindleberger, *Medical Director.*

Hœmaturia.—A beneficiary, aged 75 years and 4 months, was admitted from the Naval Home on January 26. During the night, while in the act of micturition, he had noticed that his urine was very dark. There was no dysuria or other symptom of vesicle trouble. He had neither fever nor œdema. His urine was dark from commencement of flow but became somewhat lighter near the termination. A microscopic examination showed nothing abnormal except blood corpuscles. He was anæmic and tremulous and had a heart murmur. There was no improvement under iron, strychnine, and other tonics associated with irrigation of the bladder, and mild injections of nitrate of silver. Lead and opium were also given occasionally, and also ergot. Occasionally for twenty-four hours there would be no hæmaturia and then the flow would be considerable. On March 30 urine contained granular casts. In spite of supporting treatment death occurred on May 4, though there had been no hæmaturia since April 15.

Necropsy.—Pleuritic adhesions at apices; heart small, with aortic orifice surrounded with calcareous deposits and tricuspid valves calcareous; stomach dilated; liver cirrhotic; spleen small; kidneys cirrhotic, right containing cysts; bladder small, contracted, and with walls thickened; prostate greatly enlarged, with veins much distended and tortuous. Hæmorrhage had evidently been prostatic.

Carcinoma.—A beneficiary, aged 63, was admitted February 10, complaining of indigestion and pain in chest and abdomen. The pain was referred to back, chest walls, and left side of abdomen. The liver was enlarged and there was slight fever. The liver rapidly enlarged, and on March 19 extended into left hypochrondrium and downward to a level with umbilicus. It was hard and roughened. Death occurred on March 28. *Necropsy.*—Upper portion of anterior mediastinum filled with enlarged glands, caseous on section; liver weighed 6 pounds and was full of cancerous nodules, caseous on section; gall bladder distended; stomach contained a cancerous mass about middle of greater curvature; pancreas was enlarged and cancerous and was intimately connected with a large mass of degenerated glands; both kidneys were large.

NAVAL HOSPITAL, WASHINGTON, D. C.

(*Note.*)

GEORGE A. BRIGHT, *Medical Inspector.*

Ulcus perforans.—A private marine was admitted to the sick list at the Naval Academy on October 12, 1894, with perforating ulcer of the base of the second toe, right foot. The great toe of same foot had been amputated on January 23, 1894, for similar disease. In November he was transferred to this hospital. The tissues surrounding the sinus were markedly anæsthetic, the act of probing not being felt. This condition extended to the surrounding tissues in a gradually diminishing degree until the normal sensation appeared just above the ankle. Superficial abcesses formed about second toe, but under irrigation, simple dressings, and tonics there was some improvement, the pain in the dorsal nerves and the œdema diminished and the area of anæsthesia became markedly less. On June 7, 1895, the ulcer had healed perfectly, and on June 11 the patient was discharged to duty. On June 24 he was, on account of alcoholism, again received in hospital. He recovered slowly, and on July 22 his foot began to give trouble again, swelling during the day. On August 15 two blebs filled with bloody serum formed under the second toe and later the foot became tender and the old ulcer began to slough again. On January 16, 1896, the second toe and portions of the metatarsal bone were removed under ether. A bony ankylosis of the metatarso-phalangeal articulation was found, and also a small growth of bone extending about an inch on the under surface of the metatarsal bone. On April 1 a special shoe was fitted, and on May 2 he was discharged.

Appendicitis.—Three cases of appendicitis were treated in this hospital during the year. All recovered, but surgical interference was required in two of them.

A private marine, aged 21 years and 7 months, who had suffered from malarial fever and been exposed to wet weather while on post, complained of pain in the right iliac fossa on September 21. The pain had been present since the evening of the 19th. He was transferred to this hospital on September 22, when his temperature was 103° F. On September 27 an incision 3 inches in length was made over the cæcum. On opening the peritoneum, pus began to flow into the wound. The head of the large intestine was found to be adherent to the abdominal wall and floor of iliac fossa, thus shutting off the cavity of the peritoneum. After having washed out the abscess with sterilized water, the appendix was found more or less disintegrated and separated from cæcum. Gas was escaping from cæcum through a large irregular opening, caused by the sloughing off of the appendix. All dead tissue was removed and the cavity flushed with Thiersch's solution. The cæcum was then anchored to the floor of the fossa by two catgut stitches, and the opening in the cæcum was sutured. The margins of the opening were in such bad condition that they were only approximated, but this was supplemented by stitching over a portion of the parietal peritoneum. Temperature fell after operation, but on the 29th was 103.6° in the evening, when the dressings were removed, wound opened and washed out, though nothing was found to account for the fever. The fever gradually declined, and the temperature was nearly normal on the evening of the next day. On October 1 there was another access of fever, which was then regarded as malarial, and this opinion was confirmed by the ready response to quinine. On the succeeding days the temperature was normal, and on October 11 the granulations nearly filled the wound. On November 7 the patient was discharged to duty, well.

A seaman, aged 24 years and 9 months, was admitted to hospital on July 7 with pain referred to one point in the right iliac fossa, and with temperature in the evening of 102.4° F. On July 17 the usual incision was made and an abscess found. After flushing with sterilized water, it was packed with iodoform gauze and treated as an open wound. The case did well and the patient was discharged to duty on September 21.

Epithelioma.—An officer, aged 48 years, was transferred to this hospital on May 17, 1895, with epithelioma of penis. The trouble had followed an operation which was performed on May 12, 1894, for congenital phimosis with adhesions. The wound incident to circumcision healed promptly, but the surface of the glans, which had been the seat of the adhesions, never healed, an ulcer slowly spreading, with hard base, elevated and everted edges, occupying one-half the surface, including the meatus. A microscopical examination of tissue from the ulcer showed that disease was epithelioma of the typical squamous variety. On the day of admission the penis was amputated about an inch posterior to the glans. On July 17 the wound had healed, but there was an indolent enlargement of a gland in the right groin. On August 1, 1895, he was discharged to duty; glands in groin somewhat enlarged, but general health excellent. While on leave of absence from the Department, the gland in right groin began to enlarge rapidly, necessitating its removal in September. In October another gland became indurated and he was readmitted to this hospital in a state of general debility and mental depression. An examination of groin, with a view to surgical interference, led to an adverse decision. Cancerous infiltration had taken place in the tissues, extending from the scrotum outward to the anterior superior spinous process. The tumor was tightly adherent and a probe could be passed for a distance of 3 inches. For purposes of cleanliness the sinuses were, however, opened up and the resulting cavity treated antiseptically. After improving somewhat in general condition, a mild fever developed. Protonuclein, nucleinic acid, De Baker's serum, and the combined antitoxins of erysipelas and diphtheria were used successively in this case without effect. He lost strength steadily, and death occurred on February 17, 1896.

NAVAL HOSPITAL, NORFOLK, VA.

(*Note.*)

C. J. CLEBORNE, *Medical Director.*

Urethræ strictura.—The patient was a quartermaster, 43 years of age, and the disease was of long standing. He was admitted on April 20, and on April 24 while attempting to urinate felt a sudden sharp pain in pendulous portion of urethra. The penis and scrotum became much swollen and no urine passed by meatus. There was no swelling behind scrotum. Under ether, a deep perineal incision was made just behind scrotum down to urethra, and numerous incisions were made into skin of penis and scrotum, through which considerable urine found outlets. The wound was packed with bichloride gauze, and penis and scrotum were also dressed antiseptically. The urine was drawn by catheter, which, on the following day and night, was left in bladder. A small abscess formed on dorsum at root of penis, for which an incision was required on the 26th. Exploration disclosed a cavity toward perineal opening. Communication was established, the cavity thoroughly irrigated, gangrenous tissue removed, and a rubber drainage tube inserted which emerged through the perineal incision. Urine passed without catheter, escaping through meatus and through the incision in dorsum of penis and that in the perineum. On May 13 all the wounds had healed. Urine was passed naturally and with no difficulty.

Appendicitis.—Two cases of appendicitis were treated during the year, one requiring surgical interference. Both recovered. The case in which operation was performed occurred in a fireman, who was said to have injured his right side by a fall in the fire room. His first symptoms were referred to the back over right kidney. On May 8 a tumor was made out in right iliac fossa, and on the 9th an incision was made. A large abscess was found, containing from 1 to 2 pints of pus. After evacuation and washing with Thiersch's solution, the appendix not being found in the cavity, the opening in peritoneum was enlarged. A large sausage-like projection was found attached to lower end of cæcum and directed inward and downward. This proved to be the appendix, enveloped in a thick, organized fibrous exudation. It was freed from its attachments and removed with its envelope. The resulting wound was washed with carbolic acid solution and its peritoneal surface united by a silk suture. A large gauze drain was placed in cavity and the abdominal wound partially closed. Dressings were hastily applied, as patient was in a state of collapse. He slowly reacted, and on the next day had a normal temperature, with a pulse of 120. On May 12 a counter opening, as had been originally intended, was made in the back, and a rubber drainage tube passed through both incisions. This was removed on June 3, and by June 18 the wounds had healed. A small abscess formed later in scar of wound, and a persistent fistula formed, which did not close until a silk suture appeared, which was dislodged with difficulty. This delayed his discharge to duty until October 16.

NAVAL HOSPITAL, MARE ISLAND, CAL.

(*Note.*)

GEORGE W. WOODS, *Medical Director.*

Fractura.—A boiler maker, aged 47 years, was admitted to hospital on May 2 with fracture of skull resulting from a fall down a ship's ladder on the same day. He struck the left side of head against the chain pipe and was unconscious and slightly stertorous. A large semilunar incision was made and, after turning out several large clots in the fascia, a fracture was found extending from within an inch of the occipital protuberance directly forward to the auditory canal. Several depressed parts were removed or elevated. Coma was profound, and the operation was not noticed by the patient. A large drainage tube was inserted and edges of flesh wound stitched. Respiration soon ceased to be stertorous. For three days he could only be aroused to a slight degree of consciousness and was mildly delirious. There were also occasional attacks of depression of the heart, for the relief of which strychnine had to be employed. He, however, rapidly improved, and on June 15 was convalescent. He was discharged to duty on June 23.

Dysenteria chronica.—A seaman, aged 26 years and 8 months, who had been cruising in the Tropics, was transferred to hospital on July 5 with chronic dysentery, which began on May 25. He died on August 24. *Necropsy.*—Body greatly emaciated; right pleural cavity obliterated in its upper three-fourths, and the pleura of left lung adherent over its upper half; apices of lungs in a fibroid condition and containing many areas of caseous degeneration, right apex having a large vomica; intestines with marked odor of decomposition, and in the small intestines (ileum) a very large number of ulcers about the size of a 10-cent piece; mesenteric glands much enlarged; kidneys congested and cortical substance thickened; liver dark and slightly cirrhotic; heart small.

NAVAL HOSPITAL, YOKOHAMA, JAPAN.

(*Note.*)

P. FITZSIMONS, *Surgeon.*

Anœmia perniciosa.—A cook, aged 25 years, whose duties had kept him very much confined to the lower deck for twenty months, was admitted to the sick list of his ship on March 30 and, improving under treatment, was discharged to duty after twenty-one days. On May 10 he was again admitted with anæmia more marked, and with a peculiar yellowish or brown discoloration about chin and cheeks. There was slight fever and at times diarrhœa and cramps. When transferred to this hospital, on May 25, the patient was profoundly anæmic and very much emaciated. Abdomen was somewhat distended and skin had a yellowish tinge, but there was no jaundice. Stomach was irritable. The case terminated in death on June 11. The clinical history contains record of hiccough soon after admission; constant fever, varying from 99.4° to 104° F.; troublesome diarrhœa; ulcers on dorsum of tongue; œsophageal pain on swallowing, and abdominal distention and pain, unaffected by pressure. *Necropsy.*—Lungs, normal; 8 ounces of turbid serum in peritoneal cavity, and intestines matted together by peritoneal adhesions; mesenteric glands enlarged; liver greatly enlarged, containing abscess in right lobe posteriorly, in which were 8 ounces of pus; spleen normal; right kidney a granular mass for upper third; interior of intestines normal, except many congested areas in colon.

Cystis.—An officer, aged 41 years, was admitted July 14 with cyst in right upper eyelid, which had existed for about twenty years, but had gradually enlarged until it caused great discomfort. Tumor was adherent to outer side of conjunctiva. On July 15, under ether, the canthus was incised outward for half an inch and the upper lid everted and sack dissected from it and conjunctiva. The sack extended downward between ball of eye and orbital plate and the membrane was tough. After evacuating the cheesy contents, the dissection was continued for three-fourths of an inch, and the tumor was cut with curved scissors as near as possible to its base. Boric acid solution was used as an antiseptic, and the wound was closed with catgut. The operation was followed by much swelling of upper lid and inflammation and effusion of conjunctiva, which necessitated tapping. The case progressed favorably and the patient was discharged to duty on August 18.

STATISTICAL TABLES.

The following statistical tables give in detail the data on which the statements of this report are based:

I. General view of the effects of disease and injury on the Navy and Marine Corps during the year 1896.

II. *North Atlantic Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1896.

III. *Pacific Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1896.

IV. *South Atlantic Station.*—Names of ships, average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1896.

V. *European Station.*—Names of ships, average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1896.

VI. *Asiatic Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, tranfers to hospital, discharges from the service, and deaths on each ship for the year 1896.

VII. *Receiving ships.*—Names of ships, average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1896.

VIII. *Navy-yards, marine barracks, and other shore stations.*—Names, average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths during the year 1896.

IX. *Force afloat.*—General aggregate, 1896.

X. *Force afloat.*—Detailed statement, 1896.

XI. *Navy-yards and other shore stations.*—General aggregate, 1896.

XII. *Navy-yards and other shore stations.*—Detailed statement, 1896.

XIII. *Naval hospitals.*—General aggregate, 1896.

XIV. *Naval hospitals.*—Detailed statement, 1896.

XV. *Report of vaccinations.*—1896.

XVI. *Prevalence of special diseases* (*relation by scale*).—1896.

XVII. *Mortuary record.*—1896.

XVIII. *Deaths in the Navy and Marine Corps during the year 1896* (*relation by scale*).

TABLE I.—*General view of the effects of disease and injury on the Navy and Marine Corps during the year 1896.*

Average strength	[1]14,196
Average strength shown by reports of medical department	[2]13,768
Admissions for disease	8,652
Ratio per 1,000 of strength	628.42
Ratio for previous year	673.19
Admissions for injury	2,056
Ratio per 1,000 of strength	149.33
Ratio for previous year	165.34
Total admissions to sick list during year	10,708
Ratio per 1,000 of strength	777.75
Ratio for previous year	838.53
Daily average of patients	409.03
Ratio per 1,000 of strength	29.71
Ratio for previous year	34.27
Total number of sick days	149,706
Average for each man of Navy and Marine Corps	10.87
Average for previous year	12.51
Average days each case was treated	13.98
For previous year	14.92
Discharges from service for disease	208
Ratio per 1,000 of strength	14.65
Ratio for previous year	13.34
Discharges from service for injury	36
Ratio per 1,000 of strength	2.54
Ratio for previous year	2.27
Total discharges for disability	244
Ratio per 1,000 of strength	17.19
Ratio for previous year	15.61
Deaths from disease	64
Ratio per 1,000 of strength	4.51
Ratio for previous year	5.31
Deaths from injury (including poison)	14
Ratio per 1,000 of strength	.98
Ratio for previous year	1.51
Total deaths from all causes	78
Ratio per 1,000 of strength	5.49
Ratio for previous year	6.82

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[1] Used in computing ratios of deaths and discharges from service for disability.

[2] Used in computing all ratios except those of deaths and discharges from service for disability.

TABLE II.—*North Atlantic Station.—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship, for the year 1896.*

Names of ships.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.			Number of deaths.		
			Disease.	Injury.	Total.						From ship.	From hospital.	Total.	Afloat.	In hospital.	Total.
Alliance	Year	198	116	31	147	742.42	1,312	3.58	18.10	4	---	2	2	---	---	---
Amphitrite	Year	164	46	21	67	408.54	807	2.20	13.44	14	1	7	8	---	---	---
Bache	Year	43	29	3	32	744.19	283	.77	17.98	1	---	2	2	---	---	---
Bancroft *a*	232 days	65	35	10	45	692.31	349	1.50	14.68	9	---	1	1	---	1	1
Blake *b*	Year	20	12	2	14	700.00	105	.59	14.36	1	---	---	---	---	---	---
Brooklyn *a*	31 days	36	18	1	19	527.78	70	2.26	5.25	6	---	---	---	---	---	---
Cincinnati	Year	312	127	38	165	528.85	1,284	3.51	11.24	23	---	7	7	1	---	1
Columbia	Year	453	172	48	220	485.65	1,485	4.06	8.96	26	1	16	17	---	2	2
Dolphin	Year	113	83	49	132	1,168.14	760	2.08	18.38	11	---	2	2	1	---	1
Essex	Year	183	179	36	215	1,174.86	1,373	3.75	20.50	38	---	5	5	1	---	1
Fern	Year	45	15	7	22	488.89	147	.40	8.92	6	---	---	---	---	---	---
Fish Hawk	Year	40	48	5	53	1,325.00	224	.61	15.30	---	---	---	---	1	---	1
Indiana	Year	444	308	89	397	894.14	2,688	7.34	16.54	53	3	10	13	2	1	3
Katahdin *a*	315 days	67	34	5	39	582.09	211	.67	8.60	10	---	1	1	---	---	---
Maine	Year	368	211	63	274	744.57	2,465	6.73	18.30	29	3	2	5	---	1	1
Massachusetts *a*	205 days	231	104	24	128	554.11	1,023	4.99	12.10	21	2	4	6	2	3	5
Monongahela *c*	110 days	83	40	15	55	662.65	361	3.28	11.88	2	---	---	---	---	---	---
Montgomery	Year	230	181	30	211	917.39	1,191	3.25	14.15	30	---	7	7	---	---	---
Newark	Year	317	188	71	259	817.03	1,886	5.15	16.26	12	3	1	4	1	2	3
New York	Year	533	349	93	442	829.27	3,105	8.48	15.92	38	---	9	9	1	2	3
Puritan *a*	22 days	10	3	1	4	400.00	3	.30	1.80	4	---	---	---	---	---	---
Raleigh	Year	301	203	45	248	823.92	1,611	4.40	14.62	16	1	7	8	---	1	1
Terror *a*	261 days	106	77	21	98	924.53	522	2.00	13.46	16	3	---	3	---	---	---
Texas *c*	191 days	167	133	51	184	1,101.80	1,041	5.45	17.03	29	3	8	11	---	2	2

a Commissioned. *b* Returns for only 177 days. *c* Commissioned and out of commission.

TABLE III.—*Pacific Station.—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship, for the year 1896.*

Names of ships.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.			Number of deaths.		
			Disease.	Injury.	Total.						From ship.	From hospital.	Total.	Afloat.	In hospital.	Total.
Adams	Year	147	83	19	102	693.89	978	2.67	18.18	4	1	3	4	---	---	---
Albatross	Year	61	14	7	21	344.26	218	.60	9.76	3	---	---	---	---	---	---
Alert	Year	131	94	31	125	954.20	1,340	3.66	27.95	20	---	2	2	---	1	1
Baltimore *a*	48 days	45	8	7	15	333.33	369	7.69	22.61	15	1	---	1	---	---	---
Bennington	Year	172	110	44	154	895.35	1,111	3.04	17.65	23	1	4	5	1	---	1
Gedney	Year	31	6	2	8	258.06	20	.05	1.76	2	---	---	---	1	---	1
Marion	Year	191	91	39	130	680.63	1,410	3.85	20.17	8	---	4	4	1	1	2
Monadnock *b*	316 days	141	103	36	139	985.82	830	2.63	16.08	19	---	---	---	---	---	---
Monterey	Year	167	72	30	102	610.78	868	2.37	14.20	12	---	3	3	1	---	1
McArthur	Year	27	5	3	8	296.30	34	.09	3.44	1	---	---	---	1	---	1
Oregon *b*	170 days	204	147	35	182	892.16	1,222	7.19	16.48	16	---	1	1	---	1	1
Patterson	Year	55	22	8	30	545.45	426	1.16	21.16	2	---	---	---	---	---	---
Philadelphia	Year	367	109	45	154	419.62	975	2.66	7.26	5	---	2	2	---	---	---
Pinta	Year	67	39	14	53	791.04	205	.56	8.36	13	---	---	---	---	---	---
Thetis	Year	100	47	19	66	660.00	451	1.23	12.32	9	---	2	2	---	---	---

a Out of commission. *b* Commissioned.

TABLE IV.—*South Atlantic Station.—Names of ships, average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1896.*

Names of ships.	Periods in commission.	Average complements.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.			Number of deaths.		
			Disease.	Injury.	Total.						From ship.	From hospital.	Total.	Afloat.	In hospital.	Total.
Castine	Year	138	57	15	72	521.79	1,009	2.76	19.98	7	4	----	4	---	---	---
Lancaster	Year	252	231	44	275	1,091.27	1,915	5 23	20.76	14	2	2	4	1	---	1
Yantic	Year	129	83	16	99	767.44	942	2.57	19.95	6	2	1	3	---	---	---

TABLE V.—*European Station—Names of ships, average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1896.*

Names of ships.	Periods in commission.	Average complements.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.			Number of deaths.		
			Disease.	Injury.	Total.						From ship.	From hospital.	Total.	Afloat.	In hospital.	Total.
Marblehead	Year	217	183	46	229	1,055.30	1,889	5.16	23.78	12	1	1	2	---	---	---
Minneapolis	Year	483	313	50	363	751.55	4,533	12.39	25.64	19	---	2	2	---	2	2
San Francisco	Year	344	224	50	274	796.51	2,840	7.76	22.56	6	---	1	1	2	---	2

TABLE VI.—*Asiatic Station.—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1896.*

Names of ships.	Periods in commission.	Average complements, corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service			Number of deaths.		
			Disease.	Injury.	Total.						From ship.	From hospital.	Total.	Afloat.	In hospital.	Total.
Boston	Year	266	297	57	354	1,330.83	2,792	7.63	28.68	9	2	2	4	2	---	2
Charleston *a*	209 days	159	168	31	199	1,251.57	1,714	8.20	29.46	14	---	4	4	---	---	---
Concord *a*	146 days	59	49	7	56	949.15	698	4.78	32.32	8	---	---	---	---	---	---
Detroit	Year	230	71	14	85	369.57	1,514	4.14	17.99	18	---	2	2	1	2	3
Machias	Year	149	81	17	98	657.72	645	1.76	11.83	8	---	1	1	---	---	---
Monocacy	Year	143	64	15	79	552.45	824	2.25	15.74	2	1	---	1	---	---	---
Olympia	Year	434	214	48	262	603.69	3,467	9.47	21.83	27	2	4	6	2	---	2
Petrel *b*	151 days	52	20	8	28	538.46	161	1.07	8.46	7	---	1	1	---	---	---
Yorktown	Year	189	85	18	103	544.97	947	2.59	13.69	5	---	---	---	1	---	1

a Out of commission. *b* Out of commission and commissioned.

TABLE VII.—*Receiving ships.—Names of ships, average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1896.*

Names of ships.*a*	Periods in commission.	Average complements.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.			Number of deaths.		
			Disease.	Injury.	Total.						From ship.	From hospital.	Total.	Afloat.	In hospital.	Total.
Wabash	Year	144	42	14	56	388.89	391	1.07	7.42	6	---	2	2	---	---	---
Vermont	Year	345	147	45	192	556.62	934	2.55	7.40	33	4	3	7	---	2	2
Richmond	Year	110	46	16	62	563.64	179	.49	4.45	33	2	1	3	1	---	1
Franklin	Year	187	123	8	131	700.53	884	2.42	12.92	30	---	---	---	3	---	3
Independence	Year	301	303	44	347	1,152.82	1,805	4.93	16.39	58	---	2	2	1	---	1

a Constellation included in Newport Station, Table VIII.

TABLE VIII.—*Navy-yards, marine barracks, and other shore stations.—Names, average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths during the year 1896.*

Names.	Periods.	Average complements.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.			Number of deaths.		
			Disease.	Injury.	Total.						From station.	From hospital.	Total.	At station.	In hospital.	Total.
Yards and marine barracks:																
Portsmouth	Year	145	102	41	143	986.21	551	1.51	10.38	47	...	2	2	1	...	1
Boston	Year	202	166	30	196	970.30	1,063	2.90	14.38	34	1	3	4	2	2	4
New York	Year	302	254	70	324	1,072.85	1,917	5.24	17.34	40	1	8	9	1	3	4
Philadelphia	Year	186	84	12	96	516.13	267	.73	3.92	46	...	4	4	1	...	1
Washington	Year	157	199	21	220	1,401.27	954	2.61	16.59	68	...	1	1	...	...	...
Norfolk	Year	122	142	20	162	1,327.87	542	1.48	12.14	59	...	6	6	...	...	...
Pensacola	Year	15	12	...	12	800.00	71	.19	12.93	...	...	...	...	...	...	...
Mare Island	Year	201	133	35	168	835.82	932	2.55	12.67	23	...	12	12	...	...	...
Marine Headquarters.	Year	160	81	18	99	618.75	546	1.49	9.32	27	...	2	2	1	1	2
Station at—																
Newport *a*	Year	545	272	69	341	625.69	2,126	5.81	10.66	2	10	1	11	1	...	1
New London	Year	9	9	2	11	1,222.22	78	.21	23.68	...	...	...	...	...	...	...
Annapolis	Year	450	480	60	540	1,200.00	2,474	6.76	15.02	5	...	...	...	3	...	3
Indian Head	Year	6	8	...	8	1,333.33	19	.05	8.65	...	...	...	...	...	...	...
Port Royal	Year	39	24	2	26	666.67	426	1.16	29.84	1	1	1	2	1	...	1
Puget Sound	Year	11	2	...	2	181.82	4	.01	.99	...	...	...	...	...	...	...
Special duty at—																
Boston	Year	...	1	...	1	...	14	...	...	...	...	...	...	...	...	...
New York	Year	...	9	...	9	...	82	...	...	1	...	...	...	2	...	2
Philadelphia	Year	...	5	1	6	...	285	...	...	1	...	...	...	...	...	...
Washington	Year	...	44	5	49	...	702	...	...	4	1	...	1	...	1	1
Norfolk	Year	...	3	...	3	...	104	...	...	1	...	...	...	...	1	1
San Francisco	Year	...	5	1	6	...	21	...	...	...	...	...	...	...	...	...

a Includes Torpedo Station and U. S. T. S. *Constellation.*

TABLE IX.—*Force afloat—General aggregate, 1896.*

Classification of diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided				Deserted.	Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane.				
Class I.											
Parasites and parasitic diseases	------	24	22	1	----	----	------	----	----	1	114
Class II.											
General infectious diseases (non-venereal)	18	1,395	1,122	254	6	1	------	----	9	21	11,727
Class III.											
Constitutional disorders of nutrition	1	39	21	12	4	1	------	----	----	2	363
Class IV.											
Diseases of the nervous system	7	721	647	58	11	3	1	----	3	5	3,822
Class V.											
Diseases of the visual apparatus	2	108	90	12	4	1	------	----	----	3	970
Class VI.											
Diseases of the auditory apparatus	1	56	46	5	1	1	------	----	----	4	371
Class VII.											
Diseases of the olfactory apparatus	1	38	36	2	1	----	------	----	----	------	140
Class VIII.											
Diseases of the nutritive apparatus.											
Subsidiary class 1—Diseases of the digestive apparatus	22	1,302	1,228	73	1	2	------	----	1	19	6.553
Subsidiary class 2—Diseases of the circulatory apparatus	1	78	51	20	2	----	------	----	3	3	1,205
Subsidiary class 3—Diseases of the respiratory apparatus	16	654	607	51	2	2	------	----	1	7	4,393
Class IX.											
Diseases of the motory apparatus	9	370	326	39	----	1	------	----	----	13	2,507
Class X.											
Diseases of the cutaneous apparatus	10	622	579	39	1	----	------	----	----	13	5,235
Class XI.											
Venereal diseases and diseases of the genito-urinary apparatus	45	1,069	858	211	6	----	------	1	1	37	14,630
Class XII.											
Cysts and new growths	------	16	10	5	----	----	------	----	----	1	120
Class XIII.											
Injuries	35	1,467	1,352	95	4	2	------	1	9	39	12,295
Class XIV.											
Extraneous bodies	------	9	9	------	----	----	------	----	----	------	27
Class XV.											
Poisons	3	191	183	7	1	----	------	----	2	1	727
Class XVI.											
Feigned diseases	------	2	2	------	----	----	------	----	----	------	18
Total	171	8,161	7,189	884	44	14	1	2	29	169	65,217

TABLE X.—*Force afloat.—Detailed statement, 1896.*

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided. To hospital.	Invalided. From service.	Invalided. On leave.	Invalided. To Government Hospital for Insane.	Deserted.	Died.	Continued to next year.	Total number of sick days.
CLASS I.											
Parasites and parasitic diseases.											
Echinococcus		1		1							1
Pediculus		1								1	2
Scabies		4	4								28
Tænia		12	12								50
Tinea favosa		1	1								5
Tinea trichophytina		5	5								28
CLASS II.											
General infectious diseases (non-venereal).											
Cachexia malarialis	1	19	16	4							175
Catarrhus epidemicus		283	275	8							1,446
Cholera		5	4						1		53
Cholera morbus	1	20	19	1					1		38
Dysenteria acuta	1	14	12	3							115
Dysenteria chronica		1		1							34
Erysipelas		9	7	2							76
Febris enterica		33	6	24					1	2	407
Febris intermittens	1	237	228	9						1	1,283
Febris pneumonica		53	21	28					4		550
Febris recurrens		1	1								14
Febris remittens	3	283	230	55						1	2,808
Morbilli		8	2	6							31
Parotitis epidemica		26	3	23							44
Pertussis		3	3								16
Rheumatismus articularis acutus	6	132	106	24						8	1,743
Rheumatismus articularis chronicus	3	67	47	19	2	1				1	993
Rubella		17	4	13							31
Scarlatina		1		1							0
Tuberculosis miliaris acuta		1							1		17
Tuberculosis pneumonica acuta		9		8					1		180
Tuberculosis pneumonica chronica		24		18	4					2	499
Tuberculosis of other parts	1	1		2							23
Vaccina	1	142	135	2						6	1,053
Varicella		1	1								8
Variola		5	4	1							90
CLASS III.											
Constitutional disorders of nutrition.											
Anæmia		22	9	8	2	1				2	224
Debilitas senilis		6	3	1	2						52
Diabetes insipidus	1	1		2							31
Diabetes mellitus		1	1								1
Hæmophilia		1		1							1
Leucocythæmia		1	1								5
Lithæmia		6	6								41
Scorbutus		1	1								8
CLASS IV.											
Diseases of the nervous system.											
Apoplexia		3							3		3
Atrophia muscularis progressiva		1		1							5
Cephalalgia		80	78	2							198
Dementia	1	3		3	1						83
Epilepsia		16	10	5	1						106
Febris continua simplex	2	178	173	6						1	1,017
Febris ephemera	1	142	142							1	509
Febris thermica		3	3								62
Hemicrania		3	3								13
Hemiplegia		3		2		1					29

TABLE X.—*Force afloat.—Detailed statement, 1896*—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS IV—continued.											
Diseases of the nervous system—C't'd.											
Insomnia	------	1	------	1	----	----	------	----	----	------	0
Irritatio spinalis	------	1	------	------	----	1	------	----	----	------	19
Mania	------	6	------	5	1	----	------	----	----	------	31
Melancholia	------	6	1	4	----	----	1	----	----	------	109
Meningitis	------	2	1	1	----	----	------	----	----	------	23
Monoplegia	------	1	------	1	----	----	------	----	----	------	2
Myelitis	------	1	1	------	----	----	------	----	----	------	2
Nausea marina	------	36	34	------	2	----	------	----	----	------	182
Neuralgia	------	95	88	5	----	----	------	----	----	2	465
Neurasthenia	2	18	6	12	1	1	------	----	----	------	171
Neuritis	------	5	5	------	----	----	------	----	----	------	54
Neuritis multiplex	------	1	------	1	----	----	------	----	----	------	2
Neurosis hysteroidea	------	1	1	------	----	----	------	----	----	------	1
Paranoia	------	3	1	------	2	----	------	----	----	------	9
Prostratio thermica	------	47	44	3	----	----	------	----	----	------	162
Sciatica	1	23	22	2	----	----	------	----	----	------	293
Sclerosis lateralis spastica	------	1	1	------	----	----	------	----	----	------	1
Sclerosis spinalis posterior	------	1	1	------	----	----	------	----	----	------	3
Syncope	------	4	4	------	----	----	------	----	----	------	52
Torticollis spasmodica	------	3	3	------	----	----	------	----	----	------	20
Vertigo	------	28	26	1	----	----	------	----	----	1	157
Other diseases of this class	------	5	2	------	3	----	------	----	----	------	39
CLASS V.											
Diseases of the visual apparatus.											
Amblyopia	1	1	------	1	----	1	------	----	----	------	26
Asthenopia	------	4	1	2	----	----	------	----	----	1	127
Blepharitis	------	1	1	------	----	----	------	----	----	------	2
Cataracta	------	1	------	------	1	----	------	----	----	------	18
Conjunctivitis	1	57	54	3	----	----	------	----	----	1	384
Corneæ ulcus	------	4	4	------	----	----	------	----	----	------	50
Dacryocystitis	------	1	1	------	----	----	------	----	----	------	1
Glaucoma	------	1	------	1	----	----	------	----	----	------	44
Hordeolus	------	9	8	------	----	----	------	----	----	1	19
Hypermetropia	------	1	1	------	----	----	------	----	----	------	4
Iritis	------	13	12	1	----	----	------	----	----	------	178
Keratitis	------	1	1	------	----	----	------	----	----	------	6
Myopia	------	1	1	------	----	----	------	----	----	------	7
Neuritis optica	------	3	1	1	1	----	------	----	----	------	0
Obstructio lacrimalis	------	1	------	1	----	----	------	----	----	------	5
Pterygium	------	2	2	------	----	----	------	----	----	------	36
Retinitis	------	4	1	1	2	----	------	----	----	------	29
Sclerotitis	------	1	1	------	----	----	------	----	----	------	5
Trachoma	------	2	2	------	----	----	------	----	----	------	29
CLASS VI.											
Diseases of the auditory apparatus.											
Myringitis	------	1	1	------	----	----	------	----	----	------	11
Otalgia	------	8	8	------	----	----	------	----	----	------	51
Otitis externa	------	27	24	------	----	----	------	----	----	3	128
Otitis media	1	16	11	4	----	1	------	----	----	1	166
Surditas	------	4	2	1	1	----	------	----	----	------	15
CLASS VII.											
Diseases of the olfactory apparatus.											
Antri abscessus	------	1	1	------	----	----	------	----	----	------	2
Catarrhus æstivus	------	2	2	------	----	----	------	----	----	------	14
Rhinitis acuta	1	29	30	------	----	----	------	----	----	------	98
Rhinitis chronica	------	5	3	1	1	----	------	----	----	------	20
Other diseases of this class	------	1	------	1	----	----	------	----	----	------	6

TABLE X.—*Force afloat.—Detailed statement, 1896*—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.											
Subsidiary Class 1.—Diseases of the digestive apparatus.											
Adenitis salivosa		4	4								62
Ani prolapsio		5	2	3							28
Ani rhagades		2	2								22
Appendicitis		14	10	3						1	335
Catarrhus gastricus acutus		67	64	3							197
Catarrhus gastricus chronicus		9	1	8							176
Catarrhus intestinalis acutus	2	60	60	2							307
Catarrhus intestinalis chronicus	2	6	2	5	1						291
Cholelithiasis		3	2	1							5
Colica	3	161	163	1							468
Constipatio	1	34	34	1							104
Dentis caries		8	8								15
Diarrhœa simplex	1	270	265	3						3	715
Dyspepsia nervosa		17	15	2							123
Fistula in ano	1	7	2	5		1					163
Gastralgia		3	2							1	19
Hæmatemesis		2	2								12
Hæmorrhois	1	57	48	7		1				2	519
Hepatis congestio		9	9								31
Hepatitis acuta		2	1	1							16
Hepatitis chronica		4		3					1		146
Hypertrophia tonsillaris		2	1	1							7
Icterus		18	15	3							121
Odontalgia		3	3								9
Œsophagostenosis		1		1							7
Parulis	1	3	4								11
Periodontitis		3	3								37
Periproctitis		1		1							1
Peritonitis		2		2							19
Pharyngitis		68	63	4						1	276
Stomatitis		2	2								7
Tonsillitis	10	445	436	9						10	2,218
Typhlitis		5	4	1							44
Other diseases of this class		5	4							1	42
Subsidiary Class 2.—Diseases of the circulatory apparatus.											
Blood vessels:											
Aneurysma		2		1					1		4
Angina pectoris		3		1	1				1		64
Cordis hypertrophia		2	1	1							8
Cordis palpitatio		16	12	3	1						201
Cordis valvularum morbus		10	4	4					1	1	199
Embolismus	1			1							37
Varix		9	4	5							120
Lymphatics:											
Lymphadenitis		31	25	4						2	530
Lymphangitis		5	5								42
Subsidiary Class 3.—Diseases of the respiratory apparatus.											
Asthma	1	13	7	5						2	124
Bronchopneumonitis	1	7	6			1			1		121
Bronchitis acuta	4	272	267	8						1	1,670
Bronchitis chronica	1	34	22	9	1	1				2	481
Catarrhus bronchialis	5	247	238	13						1	1,076
Emphysema pulmonalis		1			1						61
Hæmoptysis	2	7	5	4							42
Laryngitis acuta	1	26	27								171
Laryngitis chronica		4	3	1							17
Pleuritis acuta	1	36	30	7							589
Pleuritis chronica		6	1	4						1	40
Other diseases of this class		1	1								1

TABLE X.—*Force afloat.—Detailed statement, 1896*—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS IX.											
Diseases of the motory apparatus.											
Ankylosis		2	1	1							3
Arthritis		7	2	4		1					52
Bursitis		9	6	2						1	39
Caries		1								1	7
Myalgia acuta	4	269	255	9						9	1,524
Myalgia chronica	1	20	9	12							242
Necrosis		3		3							38
Ostitis		1		1							3
Periostitis		9	7	2							115
Synovitis	3	32	30	4						1	305
Thecitis	1	15	14	1						1	169
Other diseases of this class		2	2								10
CLASS X.											
Diseases of the cutaneous apparatus.											
Abscessus	2	228	217	9						4	1,858
Acne		2	1	1							3
Carbunculus	1	17	14	4							213
Cellulitis		28	25	1						2	224
Clavus		3	3								19
Cutis fissuræ		4	3	1							14
Eczema		33	19	12	1					1	484
Erythema		8	8								20
Furunculus	3	170	172							1	1,055
Herpes simplex		2	2								9
Herpes zoster	1	8	9								45
Onychia		5	5								72
Paronychia	1	23	23							1	137
Pemphigus		1	1								8
Pernio		1	1								4
Psoriasis		2	2								13
Ulcus	1	56	45	9						3	832
Unguis involutus	1	20	18	2						1	172
Urticaria		6	6								19
Verruca		2	2								20
Other diseases of this class		3	3								14
CLASS XI.											
Venereal diseases and diseases of the genito-urinary apparatus.											
Adenitis inguinalis (venereal)	11	187	148	42						8	3,683
Arthritis gonorrhoica		27	12	15							570
Balanitis	1	8	8							1	30
Calculus		2	2								2
Chancroid	4	105	92	14						3	1,418
Cystitis		26	16	9						1	351
Enuresis		3	1	2							6
Epididymitis	4	101	92	7						6	1,770
Fistula urinalis		2		2							70
Gonorrhœa	10	230	221	15						4	2,119
Hæmaturia		4	2	1						1	20
Hydrocele		1	1								39
Nephritis acuta		8	5	2					1		87
Nephritis chronica		3		3							10
Nephrolithiasis		3	3								19
Ophthalmia gonorrhoica		2	2								14
Orchitis	5	98	83	12						8	1,401
Paraphimosis		4	4								51
Perinephritis		1		1							4
Phimosis		17	16							1	232
Prostatitis		3	2	1							17
Spermatorrhœa	1			1							5
Syphilis consecutiva	5	164	97	62	6			1		3	1,955
Syphilis primitiva	2	30	22	10							399
Urethræ strictura	2	30	21	10						1	290

TABLE X.—*Force afloat.—Detailed statement, 1896*—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS XI—continued.											
Venereal diseases and diseases of the genito-urinary apparatus—C't'd.											
Urina suppressa		1	1								2
Urinæ retentio		1	1								12
Verruca acuminata		4	4								25
Other diseases of this class		4	3	1							29
CLASS XII.											
Cysts and new growths.											
Adenoma		6	4	2							64
Angeioma		1	1								3
Chondroma		1	1								6
Cystis		5	3	1						1	38
Epithelioma		1		1							2
Fibroma		1	1								3
Lipoma		1		1							4
CLASS XIII.											
Injuries.											
Abrasio	2	32	33							1	228
Ambustio ex calore	1	86	78	6						3	798
Asphyxia		3	2						1		10
Asphyxia ex submersione		9	2						7		10
Concussio		14	10	4							61
Contusio	8	378	370	7						9	2,289
Deformitas		2		1	1						11
Fractura	5	98	67	26	2	1		1		6	2,186
Hernia		38	17	19	1	1					259
Luxatio		19	12	5						2	206
Membri clades		4	2	2							47
Musculi ruptio		1								1	15
Sole excoctus		7	7								14
Stremma	3	302	290	10						5	2,472
Virium defectio		3	3								6
Vulnus contusum	3	149	144	5						3	1,088
Vulnus incisum	5	99	101	2						1	769
Vulnus laceratum	7	160	155	5						7	1,432
Vulnus punctum	1	49	48	2							293
Vulnus sclopeticum		7	5						1	1	70
Other diseases of this class		7	6	1							31
CLASS XIV.											
Extraneous bodies.											
Corpus extraneum		9	9								27
CLASS XV.											
Poisons.											
Alcoholismus	2	152	144	7	1				2		457
Dermatitis venenata		7	7								36
Venenum irritans		1	1								3
Venenum neuroticum		4	4								6
Vulnus venenatum	1	27	27							1	225
CLASS XVI.											
Feigned diseases.											
Rheumatismus articularis acutus		1	1								14
Ulcus		1	1								4
Total	171	8,161	7,199	874	44	14	1	2	29	169	65,217

TABLE XI.—*Navy-yards and other shore stations.—General aggregate, 1896.*

Classification of diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane				
Class I.											
Parasites and parasitic diseases		6	4	2							16
Class II.											
General infectious diseases (non-venereal)	6	617	517	83	2	3		2	4	12	3,474
Class III.											
Constitutional disorders of nutrition		11	9	2							98
Class IV.											
Diseases of the nervous system	3	192	164	24	1	2			2	2	815
Class V.											
Diseases of the visual apparatus	1	42	37	5						1	357
Class VI.											
Diseases of the auditory apparatus		15	14		1						107
Class VII.											
Diseases of the olfactory apparatus	1	43	39	4						1	132
Class VIII.											
Diseases of the nutritive apparatus:											
Subsidiary class 1—Diseases of the digestive apparatus	4	445	404	34		2			1	8	1,741
Subsidiary class 2—Diseases of the circulatory apparatus	1	23	13	8	1				1	1	316
Subsidiary class 3—Diseases of the respiratory apparatus	1	237	205	24		1		1		7	1,151
Class IX.											
Diseases of the motory apparatus		69	60	8						1	432
Class X.											
Diseases of the cutaneous apparatus	2	154	136	11	1					8	844
Class XI.											
Venereal diseases and diseases of the genito-urinary apparatus	3	172	58	109	3					5	828
Class XII.											
Cysts and new growths		6	5						1		112
Class XIII.											
Injuries	8	332	291	36	4	2		1	2	4	2,564
Class XIV.											
Extraneous bodies											
Class XV.											
Poisons		55	44	9	1				1		178
Class XVI.											
Feigned diseases		2	2								12
Class XVII.											
Undetermined		1							1		1
Total	30	2,422	2,002	359	14	10		4	13	50	13,178

TABLE XII.—*Navy-yards and other shore stations.—Detailed statement, 1896.*

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS I.											
Parasites and parasitic diseases.											
Scabies		2		2							0
Tænia		3	3								12
Other diseases of this class		1	1								4
CLASS II.											
General infectious diseases (non-venereal).											
Cachexia malarialis		10	6	2		2					55
Catarrhus epidemicus		116	109	3				1		3	394
Cholera morbus		19	19								53
Dysenteria acuta		3	2	1							9
Febris cerebro-spinalis		1		1							0
Febris enterica		8	3	5							161
Febris intermittens	3	251	219	32				1		2	1,275
Febris pneumonica		11	5	3					2	1	66
Febris remittens		46	31	13		1				1	192
Morbilli		7	3	4							26
Parotitis epidemica		5	5								55
Rheumatismus articularis acutus	1	22	13	7						3	154
Rheumatismus articularis chronicus		14	12	2							74
Scarlatina		2	2								59
Septicæmia		2		1					1		8
Tuberculosis pneumonica acuta		1			1						28
Tuberculosis pneumonica chronica		8	1	4	1				1	1	155
Tuberculosis of other parts		2	1	1							13
Vaccina	2	88	85	4						1	683
Varicella		1	1								14
CLASS III.											
Constitutional disorders of nutrition.											
Anæmia		2	2								8
Debilitas senilis		2	1	1							4
Diabetes insipidus		1		1							0
Diabetes mellitus		1	1								29
Lithæmia		5	5								57
CLASS IV.											
Diseases of the nervous system.											
Apoplexia		3							2	1	13
Cephalalgia		80	77	3							119
Epilepsia		5	1	4							13
Febris continua simplex		9	5	4							39
Febris ephemera		23	23								61
Febris thermica		3	3								12
Insomnia		1		1							4
Mania		2		2							0
Melancholia		3	3								35
Monoplegia		1	1								33
Neuralgia		23	22	1							63
Neurasthenia	1	15	13			2				1	198
Neuritis		1		1							13
Neurosis hysteroidea	1	1	2								12
Paranoia		1		1							16
Paraplegia		1		1							0
Prostratio thermica		5	5								19
Sciatica		9	4	5							60
Sclerosis multiplex	1				1						85
Vertigo		6	5	1							20

TABLE XII.—*Navy-yards and other shore stations, etc.*—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS V.											
Diseases of the visual apparatus.											
Asthenopia		5	3	1						1	38
Astigmatismus		2	2								11
Blepharitis		1	1								7
Conjunctivitis		15	13	2							72
Corneæ ulcus	1	3	4								62
Dacryocystitis		1	1								10
Hordeolus		4	4								12
Iritis		5	3	2							106
Keratitis		4	4								27
Myopia		1	1								1
Retinitis		1	1								11
CLASS VI.											
Diseases of the auditory apparatus.											
Otalgia		5	5								7
Otitis externa		1	1								1
Otitis media		6	5		1						96
Surditas		3	3								3
CLASS VII.											
Diseases of the olfactory apparatus.											
Antri abscessus		1	1								28
Catarrhus æstivus		4	4								18
Rhinitis acuta	1	31	31	1							58
Rhinitis chronica		7	3	3						1	28
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.											
Subsidiary Class 1.—Diseases of the digestive apparatus.											
Adenitis salivosa		1	1								2
Appendicitis	1	6	4	1		1				1	112
Catarrhus gastricus acutus		15	15								40
Catarrhus gastricus chronicus		2	2								33
Catarrhus intestinalis acutus		17	16	1							60
Catarrhus intestinalis chronicus		1		1							2
Cholelithiasis		3	2	1							6
Colica		44	43	1							99
Constipatio		20	17	3							47
Dentis caries		2	2								7
Diarrhœa simplex		94	92	2							227
Dyspepsia nervosa		4	4								15
Fistula in ano		6	2	3						1	61
Hæmatemesis		1	1								2
Hæmorrhois		13	10	2						1	93
Hepatis congestio		2	2								30
Hepatitis acuta		1	1								61
Icterus		1	1								4
Obstructio intestinalis		1							1		5
Odontalgia		10	10								10
Parulis		1	1								3
Periodontitis		1	1								4
Pharyngitis		47	41	2		1				3	159
Stomatitis		1	1								2
Tonsillitis	3	150	135	16						2	649
Typhlitis		1		1							2
Subsidiary Class 2.—Diseases of the circulatory apparatus.											
Blood vessels:											
Angina pectoris		2							1	1	22
Cordis hypertrophia		1	1								3

TABLE XII.—*Navy-yards and other shore stations, etc.*—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS—continued.											
Subsidiary Class 2.—Diseases of the circulatory apparatus—Continued.											
Blood vessels—Continued.											
Cordis palpitatio		5	4	1							26
Cordis valvularum morbis		3	1	1	1						26
Varix		3	2	1							92
Lymphatics:											
Lymphadenitis	1	9	5	5							147
Subsidiary Class 3.—Diseases of the respiratory apparatus.											
Asthma		3	3								5
Bronchopneumonitis		4	3	1							41
Bronchitis acuta		61	55	6							346
Bronchitis chronica		12	7	3		1				1	53
Catarrhus bronchialis		134	119	10				1		4	450
Hæmoptysis		4	2	2							29
Laryngitis acuta		10	9	1							32
Pleuritis acuta	1	7	6							2	172
Pleuritis chronica		1		1							8
Other diseases of this class		1	1								15
CLASS IX.											
Diseases of the motory apparatus.											
Ankylosis		1		1							1
Bursitis		3	3								8
Contractura		1	1								1
Myalgia acuta		50	43	6						1	291
Myalgia chronica		3	3								10
Periostitis		1	1								44
Synovitis		7	6	1							54
Thecitis		3	3								23
CLASS X.											
Diseases of the cutaneous apparatus.											
Abscessus		59	56	1						2	333
Carbunculus		4	3							1	81
Cellulitis		3	2	1							9
Clavus		1	1								2
Eczema		10	5	4	1						79
Erythema		4	3	1							10
Furunculus		34	32	1						1	129
Herpes simplex		7	7								27
Herpes zoster		2	2								8
Onychia	1	2	3								6
Paronychia		7	3	1						3	31
Pemphigus		1	1								8
Ulcus	1	3	3	1							35
Unguis involutus		10	8	1						1	45
Urticaria		7	7								41
CLASS XI.											
Venereal diseases and diseases of the genito-urinary apparatus.											
Adenitis inguinalis (venereal)	1	13	3	9						2	33
Arthritis gonorrhoica	1				1						7
Balanitis		2	1	1							18
Chancroid		26	10	16							196
Cystitis		7	2	4						1	87
Enuresis		1		1							0
Epididymitis		3	3								54
Gonorrhœa		70	16	54							88
Nephritis chronica		1								1	22

TABLE XII.—*Navy-yards and other shore stations, etc.*—Continued.

Diseases.	Remaining from last year.	Admitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
				To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS XI—continued.											
Venereal diseases and diseases of the genito-urinary apparatus—C't'd.											
Nephrolithiasis	1	2	3								9
Orchitis		5	3	2							56
Phimosis		1	1								8
Prostatitis		1								1	25
Syphilis consecutiva		19	5	14							127
Syphilis primitiva		10	6	3	1						75
Urethræ strictura		6	2	4							8
Urethritis simplex		1	1								5
Varicocele		1	1								5
Verruca acuminata		2	1	1							4
Other diseases of this class		1			1						1
CLASS XII.											
Cysts and new growths.											
Cystis		1	1								3
Epithelioma		2	2								17
Lipoma		1	1								47
Osteoma		1							1		2
Sarcoma		1	1								43
CLASS XIII.											
Injuries.											
Abrasio		10	10								65
Ambustio ex calore		7	7								57
Ambustio ex frigore		1		1							0
Asphyxia ex submersione		1							1		0
Concussio		3	2		1						83
Contusio	1	62	61	2							247
Fractura	2	32	21	9		2		1		1	634
Hernia		10	3	4	3						140
Luxatio		5	1	3					1		30
Musculi ruptio		1	1								9
Sole excoctus		1	1								3
Stremma	3	102	98	7							561
Vulnus contusum		42	36	6							246
Vulnus incisum		21	19	2							199
Vulnus laceratum	2	29	27	2						2	241
Vulnus punctum		4	4								43
Vulnus sclopeticum		1								1	6
CLASS XV.											
Poisons.											
Alcoholismus		49	39	9					1		124
Venenum neuroticum		1			1						19
Vulnus venenatum		5	5								35
CLASS XVI.											
Feigned diseases.											
Febris continua simplex		1	1								6
Myalgia acuta		1	1								6
CLASS XVII.											
Undetermined		1							1		1
Total	30	2,422	2,002	359	14	10		4	13	50	13,178

TABLE XIII.—*Naval hospitals.—General aggregate, 1896.*

Classification of diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
Class I.												
Parasites and parasitic diseases	1	----	4	4	----	----	----	----	----	----	1	251
Class II.												
General infectious diseases (non-venereal)	43	38	347	290	26	33	3	----	3	19	54	16,865
Class III.												
Constitutional disorders of nutrition	3	2	16	12	2	2	----	----	----	1	4	1,384
Class IV.												
Diseases of the nervous system	16	18	89	56	8	21	2	14	1	3	18	4,787
Class V.												
Diseases of the visual apparatus	4	3	20	13	1	9	----	----	----	----	4	1,099
Class VI.												
Diseases of the auditory apparatus	2	----	5	3	----	2	----	----	----	----	2	274
Class VII.												
Diseases of the olfactory apparatus	----	----	6	4	----	2	----	----	----	----	----	279
Class VIII.												
Diseases of the nutritive apparatus:												
Subsidiary class 1—Diseases of the digestive apparatus	11	10	107	88	11	13	3	----	----	1	12	5,443
Subsidiary class 2—Diseases of the circulatory apparatus	7	7	29	22	4	12	1	----	----	2	2	2,794
Subsidiary class 3—Diseases of the respiratory apparatus	12	4	81	65	7	11	----	----	----	1	13	3,735
Class IX.												
Diseases of motory apparatus	9	5	47	37	4	10	----	----	1	----	9	2,580
Class X.												
Diseases of the cutaneous apparatus	6	----	53	47	6	3	----	----	----	----	3	2,249
Class XI.												
Venereal diseases and diseases of the genito-urinary apparatus	65	34	341	301	40	27	1	----	2	4	65	21,709
Class XII.												
Cysts and new growths	2	2	6	6	2	----	----	----	----	2	----	467
Class XIII.												
Injuries	14	2	127	80	5	24	----	----	3	----	31	7,113
Class XIV.												
Extraneous bodies	----	----	----	----	----	----	----	----	----	----	----	----
Class XV.												
Poisons	2	----	16	15	1	1	----	1	----	----	----	282
Class XVI.												
Feigned diseases	----	----	----	----	----	----	----	----	----	----	----	----
Total	197	125	1,294	1,043	117	170	10	15	10	33	218	71,311

TABLE XIV.—*Naval hospitals.—Detailed statement, 1896.*

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS I.												
Parasites and parasitic diseases.												
Echinococcus			1								1	120
Scabies	1		2	3								90
Tinea trichophytina			1	1								41
CLASS II.												
General infectious diseases (non-venereal).												
Cachexia malarialis		4	5	5		1	2				1	285
Catarrhus epidemicus	1	1	10	11							1	343
Diphtheria		1									1	3
Dysenteria acuta			3	3								195
Dysenteria chronica			1							1		50
Erysipelas		2	2	3						1		71
Febris cerebro-spinalis			1							1		7
Febris enterica	4	15	27	33						8	5	1,991
Febris intermittens	7		41	47							1	775
Febris pneumonica	3	2	31	19	4	1			1	5	6	1,097
Febris remittens	14		75	77	6	1			1		4	3,592
Morbilli	1		10	10	1							318
Parotitis epidemica			23	19							4	251
Rheumatismus articularis acutus	1	2	34	26	4	3					4	1,844
Rheumatismus articularis chronicus	6	4	26	16	5	5			1		9	1,655
Rubella			12	8							4	178
Scarlatina		1	1								2	53
Septicæmia			1	1								16
Tuberculosis pneumonica acuta	2	2	11	2	2	3	1			2	5	1,172
Tuberculosis pneumonica chronica	4	4	23	3	4	18				1	5	2,398
Tuberculosis of other parts			4	3		1						382
Vaccina			6	4							2	189
CLASS III.												
Constitutional disorders of nutrition.												
Anæmia		2	9	7	1					1	2	478
Debilitas senilis	3		3	2		2					2	820
Diabetes insipidus			1	1								35
Hæmophilia			1	1								10
Leucocythæmia			1	1								27
Other diseases of this class			1		1							14
CLASS IV.												
Diseases of the nervous system.												
Apoplexia	1	1		1						1		100
Atrophia muscularis progressiva			1								1	59
Cephalalgia	1		5	4		1					1	154
Dementia	1	3	4	3				5				174
Epilepsia		1	10	3	2	3			1		2	489
Febris continua simplex	2		12	11	1						2	363
Febris thermica		1		1								2
Hemiplegia	3		2	3		1				1		262
Insomnia	1		2	2		1						54
Mania		2	7	3				6				161
Melancholia	1	1	6	2		2		3			1	157
Monoplegia	1		1			1					1	163
Neuralgia			6	3	1						2	169
Neurasthenia	1	2	13	6	2	2	2				4	897
Neuritis	1	1	1			2					1	147
Neuritis multiplex			1			1						42
Paralysis agitans		1		1								48
Paranoia		1	1	1		1						222
Paraplegia			2	2								89
Prostratio thermica			4	3						1		48
Sciatica	1		8	5	1	1					2	573
Sclerosis lateralis spastica	1	1				2						67

TABLE XIV.—*Naval hospitals.—Detailed statement, 1896*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS IV—continued.												
Diseases of the nervous system—C't'd.												
Sclerosis multiplex		1				1						21
Sclerosis spinalis posterior		2	1		1	1					1	123
Vertigo			2	1		1						81
Other diseases of this class	1			1								122
CLASS V.												
Diseases of the visual apparatus.												
Amblyopia			3	1	1	1						69
Asthenopia		1	3	1		2					1	112
Choroiditis	1	1		1		1						84
Conjunctivitis			5	4							1	151
Glaucoma			1			1						50
Iritis			4	2							2	189
Keratitis	2	1		1		2						259
Neuritis optica	1		1	2								84
Obstructio lacrimalis			1			1						35
Pterygium			1	1								37
Retinitis			1			1						29
CLASS VI.												
Diseases of the auditory apparatus.												
Otitis media	2		4	3		1					2	225
Surditas			1			1						49
CLASS VII.												
Diseases of the olfactory apparatus.												
Rhinitis chronica			5	3		2						221
Other diseases of this class			1	1								58
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.												
Subsidiary Class 1.—Diseases of the digestive apparatus.												
Ani prolapsio			3	1	1						1	66
Appendicitis	2	2	3	7								361
Catarrhus gastricus acutus			1	1								42
Catarrhus gastricus chronicus	1	1	10	8	1	3						521
Catarrhus intestinalis acutus			3	2	1							114
Catarrhus intestinalis chronicus	1	2	9	4	2	1	2			1	2	770
Cholelithiasis	2		2	2		1					1	424
Colica			4	4								51
Constipatio	1		5	4	1	1						250
Diarrhœa simplex			2	2								60
Dyspepsia nervosa			5	3	1	1						190
Fistula in ano	1		7	4			1				3	144
Hæmorrhois	2	4	11	11	2	3					1	991
Hepatitis acuta			2	2								180
Hepatitis chronica		1	2			3						329
Hypertrophia tonsillaris			1	1								36
Icterus			3	2							1	183
Œsophagostenosis			1								1	15
Periproctitis			2	1	1							71
Pharyngitis			5	5								135
Tonsillitis	1		24	22	1						2	423
Typhlitis			2	2								87
Subsidiary Class 2.—Diseases of the circulatory apparatus.												
Blood vessels:												
Aneurysma	1	2	1	1		1				2		547
Angina pectoris		1	1	1		1						184

TABLE XIV.—*Naval hospitals.—Detailed statement, 1896*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS—continued.												
Subsidiary Class 2.—Diseases of the circulatory apparatus—Continued.												
Blood vessels—Continued.												
Cordis dilatatio	1			1								125
Cordis hypertrophia			1			1						22
Cordis palpitatio	3	1	5	2	2	4					1	527
Cordis valvularum morbus	2	1	5	3		4	1					348
Embolismus			1	1								55
Varix		1	6	3	2	1					1	291
Lymphatics:												
Lymphadenitis		1	9	10								695
Subsidiary Class 3.—Diseases of the respiratory apparatus.												
Asthma			6	3		2					1	401
Bronchopneumonitis			2	1						1		85
Bronchitis acuta	2		14	16								297
Bronchitis chronica	3	1	18	17	1	2					2	795
Catarrhus bronchialis		1	19	13	2						5	591
Hæmoptysis	2		6	4		2					2	237
Laryngitis acuta			2	1	1							55
Laryngitis chronica			1			1						17
Pleuritis acuta	4	1	9	8	3	2					1	796
Pleuritis chronica	1		4	2		1					2	442
Pleuritis purulenta		1				1						19
CLASS IX.												
Diseases of the motory apparatus.												
Ankylosis			2	1		1						87
Arthritis	2	1	4	4		1					2	237
Bursitis		1	2	2					1			149
Myalgia acuta	1		12	9	1	1					2	418
Myalgia chronica	3	3	12	11	1	4					2	779
Necrosis			3	1	1	1						166
Ostitis	2		1	2		1						316
Periostitis			2	1							1	11
Synovitis	1		8	6	1						2	368
Thecitis			1			1						52
CLASS X.												
Diseases of the cutaneous apparatus.												
Abscessus	1		11	10	1						1	325
Acne			1	1								18
Carbunculus			2	1							1	165
Cellulitis			2	2								40
Clavus	1			1								48
Cutis fissuræ			2	2								16
Ecthyma			1	1								15
Eczema			17	9	5	2					1	754
Erythema			1	1								7
Furunculus			1	1								14
Paronychia			1	1								16
Ulcus	3		10	13								647
Unguis involutus			3	3								106
Urticaria	1					1						64
Verruca			1	1								14
CLASS XI.												
Venereal diseases and diseases of the genito-urinary apparatus.												
Adenitis inguinalis (venereal)	7	2	55	48	7	2			2		5	3,126
Arthritis gonorrhoica			16	9	5						2	928
Balanitis			1		1							48

TABLE XIV.—*Naval hospitals.—Detailed statement, 1896*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS XI—continued.												
Venereal diseases and diseases of the genito-urinary apparatus—C't'd.												
Chancroid	6		32	31	1						6	1,867
Cystitis	2		12	7	2	2					3	680
Enuresis			4	2	1	1						151
Epididymitis	1	1	10	9	2						1	601
Fistula urinalis	1		2	1	1	1						368
Gonorrhœa	11	3	72	67	2	1					16	3,003
Hæmaturia		1				1						43
Hydrocele		1		1								13
Nephritis acuta	2		1	3								79
Nephritis chronica	1	4	3	3		1				3	1	743
Orchitis		1	15	13	1		1				1	572
Perinephritis			1	1								7
Prostatitis	2		2	3	1							191
Pyelitis		1	1		1	1						146
Spermatorrhœa			1			1						98
Syphilis consecutiva	26	16	84	73	12	14				1	26	6,850
Syphilis primitiva	3		13	14							2	833
Urethræ strictura	3	3	15	15	2	2					2	1,328
Varicocele		1		1								20
Other diseases of this class			1		1							14
CLASS XII.												
Cysts and new growths.												
Adenoma			4	2	2							179
Carcinoma		1								1		31
Cystis			1	1								35
Epithelioma	1									1		47
Lipoma			1	1								18
Osteoma		1		1								5
Sarcoma	1			1								152
CLASS XIII.												
Injuries.												
Ambustio ex calore			6	3					1		2	144
Ambustio ex frigore			1	1								20
Concussio			2	1							1	11
Contusio	2		12	12							2	488
Deformitas			1	1								23
Fractura	8		36	21	2	6			1		14	3,429
Hernia	2	2	23	6	1	17					3	1,096
Luxatio			7	6							1	302
Membri clades	1			1								23
Stremma			17	11	2						4	688
Vulnus contusum			10	6		1			1		2	359
Vulnus incisum			4	4								83
Vulnus laceratum			5	4							1	296
Vulnus punctum			2	1							1	29
Vulnus sclopeticum	1			1								54
Other diseases of this class			1	1								68
CLASS XV.												
Poisons.												
Alcoholismus	2		16	15	1	1		1				282
Total	197	125	1,294	1,043	117	170	10	15	10	33	218	71,311

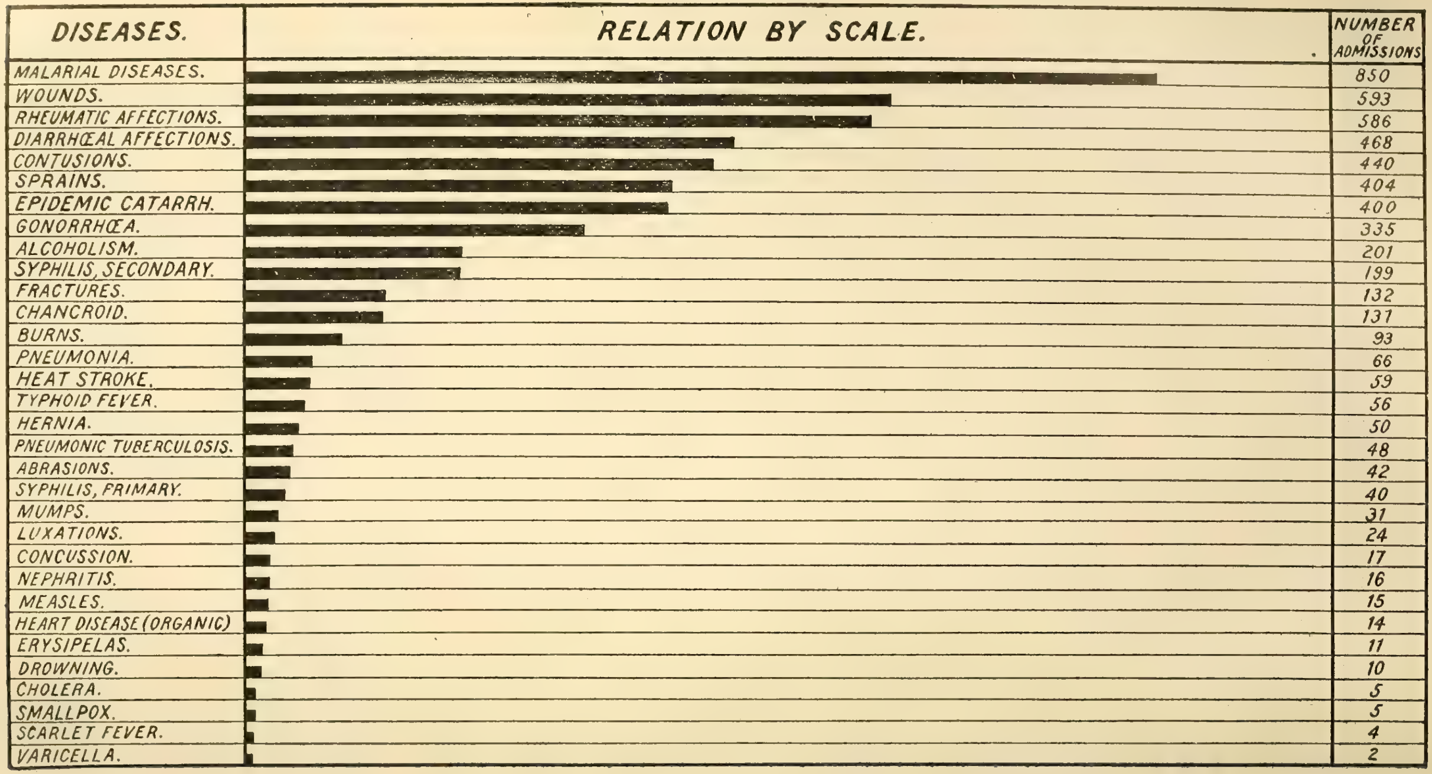
TABLE XV.—*Report of vaccination in the Navy and Marine Corps for the year 1896.*

	One or more good marks.	All indifferent marks.	Successful.	Unsuccessful.	Undetermined (transferred).	Percentage of success
Class 1. Unvaccinated			161	140	93	53.49
Class 2. Stated to have been vaccinated but having no cicatrix			155	268	152	36.64
Class 3. Vaccinated:						
Character of marks not indicated			184	1,091		14.43
Having one vaccine cicatrix	2,574	271	601	1,598	646	27.33
Having two vaccine cicatrices	1,855	154	360	1,057	592	25.41
Having three vaccine cicatrices	937	105	186	551	305	25.24
Having four or more vaccine cicatrices	643	49	113	390	189	22.47
Class 4. Evidence of former attack of smallpox			5	98		4.85
Total	6,009	579	1,765	5,193	1,977	25.37

Total number of persons included in this report, 8,935.
Total number of vaccinations successful, 1,765.
Total number of vaccinations unsuccessful, 5,193.
Total number of vaccinations with results undetermined on account of transfer, 1,977.
Total percentage of success, 25.37.

TABLE XVI.—*Prevalence of special diseases and injuries in the Navy and Marine Corps during the year 1896.*

[Average strength, 13,768.]



DISEASES.	RELATION BY SCALE.	NUMBER OF ADMISSIONS
MALARIAL DISEASES.		850
WOUNDS.		593
RHEUMATIC AFFECTIONS.		586
DIARRHŒAL AFFECTIONS.		468
CONTUSIONS.		440
SPRAINS.		404
EPIDEMIC CATARRH.		400
GONORRHŒA.		335
ALCOHOLISM.		201
SYPHILIS, SECONDARY.		199
FRACTURES.		132
CHANCROID.		137
BURNS.		93
PNEUMONIA.		66
HEAT STROKE.		59
TYPHOID FEVER.		56
HERNIA.		50
PNEUMONIC TUBERCULOSIS.		48
ABRASIONS.		42
SYPHILIS, PRIMARY.		40
MUMPS.		31
LUXATIONS.		24
CONCUSSION.		17
NEPHRITIS.		16
MEASLES.		15
HEART DISEASE (ORGANIC)		14
ERYSIPELAS.		11
DROWNING.		10
CHOLERA.		5
SMALLPOX.		5
SCARLET FEVER.		4
VARICELLA.		2

TABLE XVII.—*Mortuary record of the Navy and Marine Corps for the year 1896.*

Causes of death.	Number of deaths.					Average age.
	Hospitals.	Yards and stations.	Vessels.	Elsewhere.	Total.	
Alcoholismus		1	2		3	42.22
Anæmia perniciosa	1			1	2	37.54
Aneurysma	2		1		3	33.03
Angina pectoris		1	1		2	51.17
Apoplexia	1	2	3	1	7	44.12
Asphyxia (coal gas)			1		1	41.92
Asphyxia ex submersione		1	7		8	31.21
Bronchopneumonitis	1		1		2	41.21
Carcinoma	1				1	47.00
Catarrhus intestinalis chronicus	1				1	28.42
Cholera			1		1	30.25
Cholera morbus			1		1	28.00
Cordis valvularum morbus			1		1	50.00
Dyesenteria chronica	1				1	26.83
Epithelioma	1				1	48.25
Erysipelas (abscess of scalp)	1				1	57.00
Febris cerebro-spinalis	1				1	20.33
Febris enterica	8		1	1	10	31.81
Febris pneumonica	5	2	4		11	28.07
Hemiplegia (apoplexia)	1				1	29.58
Hepatitis chronica			1		1	28.25
Luxatio spinalis		1			1	32.33
Nephritis acuta			1		1	34.33
Nephritis chronica	3				3	36.19
Obstructio intestinalis		1			1	46.17
Osteoma		1			1	28.08
Prostratio thermica	1				1	24.08
Septicæmia (perineal abscess)		1			1	33.67
Syphilis consecutiva [a]	1				1	27.00
Tuberculosis miliaris acuta			1		1	23.25
Tuberculosis pneumonica acuta	2		1		3	28.44
Tuberculosis pneumonica chronica	1	1			2	33.50
Vulnus sclopeticum (suicidium)			1		1	25.08
Undetermined [b]		1			1	35.00
Total	33	13	29	3	78	34.32

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[a] Under treatment for syphilis, sudden death; no necropsy, cause of death stated to be syncope.
[b] Found dead in the country; no signs of violence; no opportunity for necropsy.

TABLE XVIII.—*Deaths in the Navy and Marine Corps during the year 1896.*

[Average strength, 14,196; total number of deaths, 78; ratio per 1,000 of strength, 5.49.]

CAUSES OF DEATHS.	RELATION BY SCALE.	NUMBER OF DEATHS.
PNEUMONIA.		11
TYPHOID FEVER.		10
APOPLEXY.		8
DROWNING.		8
PNEUMONIC TUBERCULOSIS.		5
KIDNEY DISEASE.		4
POISON.		3
ANEURISM.		3
HEART DISEASE.		3
BRONCHO-PNEUMONIA.		2
CANCER.		2
LOCAL INJURIES.		2
PERNICIOUS ANÆMIA.		2
ASPHYXIA (COAL GAS)		1
CEREBRO-SPINAL FEVER.		1
CHOLERA.		1
CHOLERA MORBUS.		1
DYSENTERY.		1
ERYSIPELAS.		1
HEPATITIS.		1
INTESTINAL CATARRH.		1
INTESTINAL OBSTRUCTION.		1
HEAT-STROKE.		1
MILIARY TUBERCULOSIS.		1
OSTEOMA.		1
SEPTICÆMIA.		1
SYPHILIS.		1
(UNDETERMINED)		1

REPORTS ON UNITED STATES NAVAL HOSPITALS.

REPORT ON NAVAL HOSPITAL AND NAVY-YARD, PORTSMOUTH, N. H.

By J. B. Parker, *Medical Inspector, United States Navy.*

During the year there were 143 admissions at the navy-yard, one of this number being the admission and discharge (asphyxia ex submersione) of a private whose body was discovered in the Piscataqua River some weeks after his disappearance from the barracks. Of the 142 cases treated all recovered and returned to duty, 47 of the number having received treatment in hospital; 83 were medical cases, 40 surgical, 12 alcoholic, and 7 specific. Of the number admitted to hospital we note: Tonsillitis, 1; gonorrhœa, 5; ambustio ex frigore, 1; febris intermittens, 1; stremma, 1; catarrhus bronch., 2; bronchitis chr., 2; rhinitis chr., 1; alcoholismus, 2; rheumatismus art. chr., 1; bronchitis ac., 3; luxatio, 2; paraplegia, 1; colica, 1; vulnus contusum, 6; lymphadenitis, 2; bronchopneumonitis, 1; syphilis prim., 2; myalgia ac., 2; urethræ strictura, 1; catarrhus intest. ac., 1; cephalalgia, 1, epilepsia, 1; fractura, 2; cystitis, 1; diabetes insipidus, 1; enuresis, 1; eczema, 1.

The following is a summary of the yearly sick report:

No contagious or infectious disease has appeared within the yard and general good health has prevailed. At the barracks the association of good health and morals is again conspicuous, if we examine the conduct record, as the number of punishments was only 93; and in no case was the infraction deemed sufficiently serious for a court-martial. The departure of about 40 of the older men at the garrison and the arrival of as many recruits may have contributed to the improvement in conduct. For the most part the recruits are American farmers or laborers, and few, apparently, have contracted bad habits. Those with whom the medical officer has come in contact seem to accept willingly the rigid requirements of the military service.

If the supposition be correct that with new men comes better order, it signifies that it is an advantage to the service to transfer men to ship or other station after long residence at one point.

Permission to wear woolen gloves on duty during severe weather followed the last report from this station, and contributes to the comfort and health of the guard. It is hoped, however, that the privilege is preliminary to their addition to the clothing outfit, that additional expense on the part of the wearer may be avoided. I beg to renew mention of the necessity of a warm rubber boot, sufficiently long in the leg to be overlapped by the rubber coat, in lieu of the arctic shoe now worn in wet weather. The quality of the clothing of the marines has fallen below its former high standard, particularly in the article of trousers. Upon inquiry of the officer acting as quartermaster, I am informed that complaint has been made, with some reason, as indicated by the loosely woven character of the goods when directed to natural or artificial light. No change in the ration can be noted or desired, unless it is a better preparation of the food, which can only be expected when better cooks are employed. The necessity of meat three times daily is not apparent, and it is believed the substitution of a cereal and fresh or dried fruit at the evening meal would be agreeable and beneficial. Indeed, the excess of nitrogenous food must be injurious in requiring great eliminative work to preserve the normal balance of vigorous men who of necessity pass much of their time in idleness.

No immediate necessity is more apparent at the barracks than a better illuminant. For years deficient light has caused much embarrassment and danger to eyesight, notwithstanding several official appeals for relief. The last board of survey, November 26, 1895, composed of a commander, captain of marines, and a passed assistant engineer, found absolutely no gas pressure beyond the center of the building, and here only a slight pressure. In the quarters of the commanding marine officer, where the gas pipes first reach the building, it is only at times that reading can be accomplished at night without the aid of lamps. The report of the board referred to above was that "it must inevitably result in injury to the eyes." The engineer in the yard in charge of the gas house states that no improvement in light can be expected or accomplished until a larger main from the gas house to the barracks is placed and the distributing pipes in the building enlarged; that the pipes are old and were not intended to supply the present number of burners.

The need of a building in the grounds of the barracks for games, reading, and smoking, as at other stations, to prevent lounging in the dormitories, is again presented for the consideration of the Bureau.

The establishment of a canteen at the barracks during the year caused some apprehension inside and outside the yard, lest the health and morals of the community be disturbed. In the neighboring prohibition town of Kittery, through which the main avenue from the yard to Portsmouth passes, special alarm was experienced, and to such a degree that protest was threatened. Better results have followed than was anticipated. Personal knowledge of the institution since its establishment, owing to its location near the dispensary, authorizes me to state that while evidently a very popular institution, if we may judge by the ingress and egress, not a case of intoxication has been observed, nor has there been disorder of any kind. I feel at liberty to state that inebriation has certainly been less, and the men have remained more in barracks. Experience must yet determine fully whether the favorable result mentioned is the propter hoc or the post hoc. Personally I am disposed to believe that the transfer of men, some of them disposed to intemperance and disorder, and the substitution of as many recruits, had much to do with the improvement in conduct.

In the last report reference was made to a recent contraction of the vaults (latrines) in the rear of the commissioned officers' quarters, the bottom of the pits being raised to the level of the discharge to sewer, and to the removal of a "ventilator," about 12 or 15 feet in height, at the summit of the sewer, from which often came a noisome and poisonous odor. Much improvement has followed the removal of the ventilator, as the more general use of the rear alleyway by pedestrians and others, whose duties or location permitted a circuitous route, abundantly demonstrates. The nature of the sewer—a blind one, without proper fall at the head—is such that it is difficult to confine its odors, particularly when westerly winds enter its capacious and usually open mouth.

The commandant, always interested in the health and welfare of the station and its officers, now hopes to prevent the sewer odor by connecting with the small sewer pipe of the warrant officers' quarters, distant a few yards. Although in part an experiment, it is hoped this connection will permit a free circulation throughout the entire sewer.

During the year a plan was submitted for a new dispensary building in the yard, should the Department decide to replace the present old hospital structure. The present building has been in use nearly a century, and the date can not be far distant when it must be abandoned.

The office of the medical inspector, formerly the tool house and storeroom, is equally ancient, and its saturated ceiling from recent rains and snows and chronic dampness from absence of a foundation wall also testify to the necessity of reconstruction.

A paint shop near by is a substantial two-story brick building, occupied only during working hours, but an exchange could not be made unless the old hospital building was strengthened to sustain the weights a paint shop may require.

At the hospital the following work has been accomplished during the year: Placing of a Blake improved vertical duplex steam pump in engine room, for use in case of fire and for pumping to tank in attic; introduction of Welsbach burners throughout the hospital buildings where needed; repairs to steam and other pipes of the boiler house and hospital; preparation and furnishing of an aseptic operating room; introduction of a window in wall of boiler house; preparation of room to be used as a bacteriological room; minor repairs to pipes, bath tubs, sinks, etc.

The following is in process of accomplishment: Fitting of bacteriological room; building of a disinfecting plant.

The city of Portsmouth has preserved its usual health, apart from a few cases of diphtheria. Antitoxin was used generally, so far as we can learn, and with success in most cases. The purchase by the city during the year of a suburban farm, with dwelling for use as a pest hospital, has finally been accomplished.

REPORT ON NAVAL HOSPITAL, CHELSEA, MASS.

By JOHN H. CLARK, *Medical Director, United States Navy.*

GENERAL CONDITION.

The buildings, grounds, fences, and walls are in essentially the same condition as one year ago. The usual slight repairs have been made from time to time as were necessary on plank walks, fences, doors, windows, greenhouse, etc. The principal repairs and improvements will be noted.

REPAIRS.

The work of re-covering the roof of the surgeon's quarters with slate or tin and repairing gutters and conductors has been satisfactorily completed since last report.

The tin roof on L of pesthouse has been painted.

A new gate house has been placed over the gate shutting off the water supply to the pesthouse.

The wire fence around pasture and cemetery has been extensively repaired. The wooden fence on Broadway has been renewed. The stable drain was opened and repaired on the occasion of its being blocked and causing the stable cellar to be over half filled with water. Unfortunately, water from stable, ambulance shed, and, worse than both, the water draining from the hill behind the stable, pass through the cellar to enter the drain.

IMPROVEMENTS.

The following important improvements have been made during the year:

1. An aseptic operating room has been fitted with modern appliances, including sterilizers and a liberal supply of the best aseptic furniture.
2. Invaluable work has been done in locating drains, sewers, water and gas pipes, electric and steam plants, and in the survey of the grounds and buildings. The result of this work is shown in blue-print tracings.
3. A small room is being fitted for use as a bacteriological, chemical, and microscopical laboratory for clinical work.
4. A telephone was installed in October, by which ready communication is established with all telephonic points within a radius of 8 miles of the City Hall, Boston.
5. The pillows and mattresses bought in 1895 have been supplied with linen covers.

NEEDS.

1. A new fence is very much needed between the hospital and ordnance grounds. The present one is badly decayed.
2. The two kitchen ranges will require to be replaced before long. They were installed in October, 1881, at a cost of $287. They have required frequent repairs during the past year, and, although they are serviceable now, they are liable to break down at any time.
3. The ice chests need relining and other repairs.

RECOMMENDATIONS.

In addition to the recommendations of last year I would suggest:

1. The rebuilding of those portions of the three chimneys in the the surgeon's quarters which are above the roof, and therefore exposed to the weather. In placing the flashing around these chimneys last winter the mortar was found to be finely pulverized and friable. It also falls down one of the chimneys in considerable quantity in stormy weather.
2. The placing of a water gate at the junction of the old and present water mains to separate the flowing water from that which is mostly stagnant.

REPORT ON NAVAL HOSPITAL, NEW YORK, N. Y.

By Thomas N. Penrose, *Medical Director, United States Navy.*

In a previous report, the scheme of the extensive alterations in the interior construction and the plan of improvements contemplated were outlined in a general way and the progress of the work to date was noted.

Owing to the failure of the original contractor to complete the work undertaken, it became necessary to obtain other bids for carrying out the unfinished contract, during which time all work was necessarily suspended.

Since then, however, the progress has been steady and the work of improvements and repairs is now rapidly approaching completion.

To the end that a general view of the extensive nature of this work be had, I desire to state that within the open court, inclosed on three sides by the main hospital building, is a three-story structure of red brick, in which will be the general mess hall (first story), dispensary and chapel (second story), and operating room (third story).

Immediately east of this structure, across the rear driveway, is the kitchen building.

These buildings are connected with each other and with the main building by corridors or bridges, to be glass inclosed.

The new electric elevator is located in the space between the main building and the courtyard building and adjoins the glass corridor or bridge with which it connects. This is nearing completion.

In the field south of the main building toward the Flushing avenue entrance to the grounds stands the new ward building, to be three stories in height, built of buff bricks.

This structure is likewise to be connected with the main building by inclosed corridors and is already two stories high.

MAIN BUILDING.

The renovation of the main building has been very thorough. Wherever the plastering was found old or broken it was removed, and the walls and ceilings were refinished and then painted with three coats of good paint.

Certain apartments set aside for the accommodation of sick officers were rearranged with bath and closet en suite. Medical officers' quarters were similarly arranged, and a few other rooms subdivided.

The entire system of plumbing was renewed throughout with increased bathing facilities, and the building was repiped for gas in the event of failure of the electric-lighting system.

A large and attractive entrance doorway and vestibule, with double doors of handsome design having ample and heavy plate-glass panels, replace the original unsightly construction.

This arrangement is particularly advantageous in the way of lighting the front corridors and the main stairway facing the front door, which is also new, and in point of solidity and generally pleasing appearance is in marked contrast with the antiquated stairway which it supersedes.

Throughout the first story the plank flooring of the corridors has been removed, and in place thereof a fine, solid flooring of small white vitrified tiles has been laid.

The junctions of the floor and walls have been worked out in curves of cement of 2½-inch radii, thus eliminating angular spaces favorable to the deposit of dust.

One desirable feature of this tile flooring is that the hallways, formerly dark and forbidding in appearance, are transformed into bright, cheery corridors of apparently increased size, and, odd as it may seem, there is less noise from footsteps, owing to the great solidity and consequent absence of reverberation.

In all the rooms on the first story, except the medical officers' quarters, fine new floors of hard wood have been laid.

Throughout the second story the corridors have received a new flooring of narrow, hard wood, as have also those rooms not previously treated in this way. The walls and ceilings throughout have received three coats of paint.

NEW BUILDINGS.

The courtyard and kitchen buildings are under roof, the partition studding in place, and lathing nearly finished.

The great skylight of operating room is also nearly finished.

OPERATING ROOM.

The operating room itself, situated on the top floor of the courtyard building now rapidly nearing completion, will, it is reasonably hoped, be among the best appointed and most completely equipped surgical operating rooms to be found anywhere. Every condition of hygiene has been considered and every means adopted to facilitate the employment of modern methods of surgical practice.

This is a large apartment, 25 by 45 feet, and will have a floor of smooth white vitrified tiles, gently sloping from all sides to a well-constructed central drain of approved design.

The walls are finished in Keene cement, with curved, glazed tile junction at floor, while the junctions of adjacent sides and of sides and ceilings are worked out in cemented curves of small radii. Here complete elimination of angular spaces is accomplished.

The arrangements for lighting, heating, and ventilating are excellent, and with the etherizing, recovering, and sterilizing rooms and lavatory adjacent and the many provisions for the comfort and welfare of the patients and their attendants, this feature of the new régime will be very complete.

KITCHEN BUILDING.

The plan of having the general kitchen in a building separate from the hospital proper is a preeminent advantage.

Obviously the absence of odors of every description is an important desideratum in hospital hygiene, and one almost impossible to attain when the kitchen is located, as it has been hitherto, in the building where the sick are quartered.

The new kitchen itself will be quite large and well ventilated, and equipped with large, modern ranges and steam cooking apparatus.

The smoking room for convalescents will constitute the second story of the kitchen building, and will in its appointments insure a degree of comfort for the men never before provided in this direction.

STERILIZER.

A new laundry sterilizer, intended for sterilizing the weekly wash of the hospital, has lately been installed, and has met successfully the bacteriological tests applied at my request by P. A. Surg. Charles F. Stokes, United States Navy.

A dried sporulating culture of anthrax was used in the test, from which subsequently no growth could be obtained, attesting the efficiency of the apparatus in destroying micro-organisms, the conditions requisite for the destruction of anthrax spores being safely considered standard.

ANNEX.

In this connection it may be stated that during part of the past year the annex building for acute infectious and contagious diseases has been used for purposes of isolation in a number of cases of that character.

As a means of fumigation the vapor of formaldehyde was used, but the bacteriological tests did not show complete destruction of microorganisms. I suspect, however, that a defect in the technique of preparation or the nonobservance of details in the application of the vapor may have contributed to the unsatisfactory results, so the case is hardly conclusive against formaldehyde, although the process was carried on by persons interested in the success of the method. Still the positive results obtained by others in its use as a disinfectant would seem to justify every confidence in it where the conditions are favorable. The usual means of purification were afterwards resorted to.

GATEHOUSE, ETC.

The new gatehouse, very much larger than the old one, is now finished and tenanted, and embodies all modern conveniences.

The handsome new iron gates at the main entrance of the grounds are in position, and the old cinder sidewalk, extending the length of the hospital property on Flushing avenue, has been replaced by one of rock asphalt 12 feet wide.

The space between the sidewalk and the curb has yet to be sodded, but trees throughout the whole length of the walk have been planted.

The Brooklyn Tree Planting Society was consulted with reference to the selection of the best variety of trees for the purpose, consideration being had for rapid growth, beauty, symmetry, and hardiness.

When the work is finished in every respect a great transformation will have taken place in what was once a very unsightly portion of the property.

ENGINE HOUSE.

The efficiency of the steam-heating plant has been augmented by the addition of a horizontal steel return tubular boiler designed to carry a gauge pressure of 80 pounds per square inch and by the installation of a powerful Worthington duplex pump with full capacity for supplying the entire battery of boilers and with good margin for emergency fire service.

Additional radiators are also distributed throughout the hospital buildings.

NEW WARD BUILDING.

The walls of the new ward building are being rapidly run up, and the present indications promise pleasing architectural effects.

When this building is completed, the capacity of the hospital will be practically doubled.

ADDITIONAL WORK.

There is yet a vast amount of work necessary in order to beautify the grounds. Asphalt walks and new driveways are about to be laid out under the supervision of the Department of Yards and Docks. Trees are to be planted, outhouses, sheds, and rubbish incident to the building operations must be removed and the grounds adjacent to the northern and western boundary walls must be sloped and sodded. The plan further contemplates the erection of handsome iron entrance gates to replace the old wooden ones on Flushing avenue immediately west of the main entrance; the transformation of the present vegetable garden into a grassy lawn with intersecting asphalt walks, the removal of the greenhouse and hotbeds and a general improvement of the condition of the Naval Cemetery.

When this contemplated work shall have been finished and the full catalogue of improvements worked into a harmonious whole, the New York Naval Hospital will take rank in point of equipment, beauty, comfort, and potential efficiency second to none.

REPORT ON NAVAL HOSPITAL, PHILADELPHIA, PA.

By George H. Cooke, *Medical Director, United States Navy.*

During the year there have been treated in this hospital 335 cases, of which 193 were derived from the active list of the Navy and Marine Corps, and 142 from beneficiaries, the retired list, etc. As statistics relating to the former will appear elsewhere in the Surgeon-General's report, it is considered desirable to complete the general record of the work of the hospital by supplying suitable data relating to the latter.

The 142 diseases and injuries, furnishing 4,495 sick days, and occurring among beneficiaries and others not on the active list, appear under the following classification:

Classification.	Cases.
General infectious diseases (nonvenereal)	13
Constitutional disorders of nutrition	9
Diseases of the nervous system	23
Diseases of the visual apparatus	2
Diseases of the nutritive apparatus:	
Subsidiary Class 1.—Digestive apparatus	10
Subsidiary Class 2.—Circulatory apparatus	7
Subsidiary Class 3.—Respiratory apparatus	6
Diseases of the motory apparatus	7
Diseases of the cutaneous apparatus	1
Venereal diseases and diseases of the genito-urinary apparatus	17
Cysts and new growths	2
Injuries	12
Poisons (alcoholism)	33

Of these cases 113 were discharged as recovered, 3 were transferred to Government Hospital for the Insane, 18 died, and 8 remained in hospital at the end of the year. Nearly one-third of the sick days was due to dementia and hemiplegia. Only 166 sick days were caused by alcoholism. The average age of those who died was 66$\frac{4}{12}$ years, and the causes of death were as follows: Pneumonic tuberculosis (4), senile debility (2), multiple sclerosis (1), hemiplegia (2), aneurism (1), prostatic hæmorrhage (1), disease of heart (1), gangrene (1) carcinoma (1), encephalitis (1), and disease of kidney (3).

IMPROVEMENTS.

During the year the more important improvements in the hospital establishment were as follows:

The addition to the stable, the fixtures for the interior and all necessary requirements, including the laying of the cement pavement outside, were completed in August, and there are now stalls for the accommodation of four horses, together with one roomy box stall. Ample space in the adjoining coach house is provided for the ambulance and express wagon, and there remains sufficient space to accommodate additional vehicles.

On completion of the stable a much-needed walk, 3 feet wide, connecting it with the main road through the grounds, was laid, the material used being the surplus bricks and stone.

The new ambulance, perhaps the finest in the city, arrived in September and has done admirable service. The first trip was made October 9, and while ships are fitting out at League Island, daily trips (Sunday excepted) are made to the navy-yard; otherwise on alternate days, unless ordered out in response to emergency calls.

It is to be regretted, perhaps, that the distance (4 feet 10½ inches) between the wheels does not permit these to track with the rails of the trolley lines, by which the streets of Philadelphia are so generally traversed, the gauge of which is 5 feet 2 inches, and to which vehicles in this city are usually made to conform, thereby rendering the work of horses much less laborious. The same conditions apply to the unpaved portions of the city, such as the drive of South Broad street, from the built-up section to League Island, over which the trips of the ambulance are most frequently made. During bad weather, when the roads are muddy or covered with snow, the work of the horse is much increased by reason of not tracking with other vehicles, and it has been found necessary to substitute the lighter express wagon at such times. With the wheels more widely separated, say, by 3½ inches, the width of the body of the ambulance might have been similarly increased, thereby affording more room for the medical attendant when a patient is on the stretcher and requiring assistance en route.

After much delay, due to the fact that the contractor twice furnished an inferior article which on inspection was condemned as not equal to the standard, an invoice of corrugated rubber matting, entirely satisfactory in quality, was received and properly laid in December. Four wards and the halls on the first floor are now laid with the matting, which is a vast improvement over the old style cocoa matting in appearance, convenience, and cleanliness. A further desirable improvement in line with this would be the covering of the iron steps of the main stairway with sheets of rubber, not only for the purpose of insuring a better foothold, but, which is of quite as much importance, to suppress the noises caused by walking on the iron surfaces, at present a source of annoyance.

ELECTRIC LIGHTING.

The work of wiring the hospital buildings for electric lights was commenced January 17, and completed and the current turned on a few days before the end of March. The superiority over the old system of gas lighting need not be enlarged upon.

The accompanying table will show at a glance the comparative expense of the two systems:

Cost of lighting hospital buildings.

Quarters.	Gas.	Electricity.	Total.	Corresponding quarters of 1895, gas only.
First, 1896	$345.30	----------	$345.30	$289.70
Second, 1896	42.30	$156.69	198.99	142.70
Third, 1896	16.60	126.70	143.30	106.30
Fourth, 1896	16.70	227.19	243.89	229.60

Total number of gas jets in hospital and annexes, 274; total number of electric lamps in hospital and annexes, 303; number of electric lamps in use daily, 82. Of these, 37 burn an average of thirteen hours daily and 45 burn an average of four hours per day, making an average of eight and a half hours for the entire 82 lamps.

By way of explanation, referring to the column giving the items in question, it may be stated that gas is still being consumed in the hospital for the following purposes: In the operating room, three sterilizers, for water, instruments, and bandages, respectively; one Bunsen burner in bacteriological laboratory; one Bunsen burner in dispensary; two lamp-posts in front of building; one light in smoking room, and generally throughout the hospital when, from any cause, the electric lights fail.

In this connection I would submit, for consideration of the Bureau, the feasibility of installing a complete electric-lighting plant. It is believed that the saving thereby effected would in due time, say in the course of a year or two, repay the outlay incurred. A dynamo with necessary connections of capacity sufficient to supply 500 lights could, it is believed, be installed at an estimated cost of between $500 and $600. To run this, an engine abandoned some time since, but still in position in the engine house and in good repair, could be made available, while the present boilers are of ample capacity to furnish the necessary motive power.

ELECTRIC BELLS.

I would also state, in connection with this subject, that a much needed improvement is the introduction of electric bells. The quarters for the medical officers and officer patients, the various offices and other rooms, are at present provided with no means for summoning attendants other than small call bells, which are generally inadequate for the purpose. The introduction of electric bells is therefore earnestly recommended, with the suggestion that the annunciator for all the purposes of the hospital proper might be located in or near the main hall, lower floor, where an orderly is always stationed during the day, and in close proximity to which, in the dispensary, a night nurse is stationed. These being in constant attendance, would therefore always be on hand to respond to calls from any part of the building, summon attendants, execute orders, etc.

A great defect in the original construction of the hospital was that of concealing the spouts which conduct the rain water from the roof inside the walls of the building. As a result they can not be reached in order to clear them of any obstruction, such as leaves of trees, etc., which, carried by winds to the roof, enter the openings and become impacted. Neither are they accessible for repairs in the event of leakage. Injury to the walls and plastering of apartments, from percolation of water during rains, has resulted, and it was found necessary to run new lines of spouting down the outside of the walls. This had already been done at five different angles of the building when, in December, another leader at the south end being found choked, the same change was necessitated there. By this means the defect has been remedied, and eventually, no doubt, a similar alteration will become necessary of all the remaining leaders.

The cement floor in basement of both wings was completed in July last, and has proven an admirable improvement upon the old unsightly brick pavement.

The telephone was introduced and connection established during the month of August. The facility, promptness, and convenience with which oral communication may now be had with any desired point, and its value therefore as a labor-saving device in respect to letter writing alone can hardly be overestimated.

In the engine department the usual annual repairs were made to the steam-heating apparatus, which included the following: The boilers and two pumps were overhauled; three steam traps were put in place and have proved themselves to be great steam economizers; a ventilator, designed to prevent offensive odors from the laundry and boiler room, where the kitchen garbage is burned, from being drawn into the hot-air duct and distributed throughout the hospital, was built and is entirely effective for the purpose intended; and a new step and bearing were put into the centrifugal wringer in the laundry.

The fire hose was overhauled and repaired.

The steam pipe concealed under flagging forming the floor of the purveyor's storeroom in basement having sprung a leak, it was abandoned, and new piping, raised above the floor, put in place and connected.

In addition to those enumerated, there were many repairs made during the year to steam pipes, heaters, etc.

Various parts of the hospital were repainted.

Instructions having been received November 10 to fit up a bacteriological and chemical laboratory, action was immediately taken to comply with the Bureau's order.

The room formerly occupied by the medical examining board, on the second floor near the main stairway of the hospital, was selected. This is a large room, 19 by 34½ feet, well lighted by six tall windows—three on the north, two on the east, and one on the south sides—and supplied with two combination chandeliers, each being furnished with two gas burners, two incandescent electric lamps of 16 candle power, together with electric attachments for drop lights. The carpet was taken up and the floor stained and shellaced, after being thoroughly scraped and cleaned. The examining-board library books, bottles, and jars, containing specimens of many kinds, etc., were removed, and the doors of the bookcases, which latter are 16 feet long by 9 feet high, were glazed and all woodwork painted white. The ceiling and walls, after being thoroughly renovated, were covered with three coats of paint—the ceiling white, the walls to a height of 6 feet from floor and thence to ceiling in two shades of drab, the darker at bottom, with a 7-inch band of stenciling at the line of demarcation, and another band, 15 inches wide, in slate color, around the top of walls.

The room contains 5 tables of various sizes, 3 covered with hammered glass one-half inch thick, the edges ground, and 2 microscope tables. A fine black-walnut case, 5½ by 6 feet, with sliding glass doors, was brought down from the old bacteriological room and placed in position, and the bacteriological case furnished by the Bureau has since been put in place. On the north side of the room, and opening into it, is the former bathroom, 7½ by 6¼ feet, which has been converted into an admirable photographic dark room. The old bath tub has been removed and replaced by a heavy porcelain sink, 4 by 2 feet by 7 inches, backed with a wall slab of slate, 2 by 4 feet by 1½ inches, to which hot and cold water pipes, furnished with patent "Saville" stopcocks at a height of 22 inches from the floor of the sink, have been fitted. This room is also furnished with hand basin, with hot and cold water faucets, "Sypho" water-closet, shelving for chemicals, draining board, etc.

The room is lighted by a large window, looking eastward, the panes of which have been covered with sheets of ruby glass laid over them; and as an additional protection against the entrance of actinic rays a nonactinic cloth shade, running in deep grooves at the sides, has been fitted to the window. There is a combination fixture with one gas jet and one electric lamp, the bulb of which is of ruby glass, and both jet and bulb are inclosed by ruby globes. The entire interior is painted dead black, and the room seems admirably suited to the purpose for which it is intended. Quite a quantity of apparatus, including two microscopes, microphotographic camera and accessories, culture oven, two sterilizers, etc., which constituted the outfit of the old bacteriological room on the third floor of the hospital, has been transferred to the new room, and when the supplies yet to be furnished by the Bureau have been received, the facilities for chemical, microscopic, bacteriological, and photographic work will be most complete.

The portable bath tub, handsomely and substantially made, which was received in July, is a vast improvement, both as to convenience and effectiveness, over the old system of sponging, and has rendered excellent service in the treatment of cases of heat stroke, typhoid fever, etc.

The quality of the supplies furnished the hospital during the year has very materially improved, due to the fact that the instructions of the Bureau to establish a fixed standard of the highest grade for every article, and to which the corresponding commodity furnished by the contractor must be required to conform, has been strictly carried out. Insistence on this requirement has in several instances given well-deserved annoyance to contractors, whose bids were presumably placed at a less figure than that at which they could profitably furnish the article called for and therefore failing to equal the standard required; and in one instance, the bread supply, it was found necessary to annul the contract and invite new proposals. This was accordingly done, and I am happy to state that the bread now furnished the hospital is superior to any which has been supplied in years past.

IMPROVEMENTS RECOMMENDED.

PESTHOUSE.

During the year 1896, 5 cases of typhoid fever, 5 of mumps, and 1 of measles were treated, 2 of the first named terminating fatally. One of these, admitted from the Naval Academy practice ship *Bancroft,* presumably originated at Old Point Comfort, Virginia. The other fatal case was admitted from the U. S. S. *Massachusetts*, then lying at League Island, Pa., as with febris continua simplex, but symptoms of typhoid developed twenty-four hours after admission. In this instance, as in the case of the other 3 typhoid patients (1 from the U. S. S. *Indiana* and 2 from League Island Navy-Yard), none of which proved fatal, the origin of the disease is not clearly traceable.

The case of measles—1 of 7 admitted during the previous year—came from the U. S. R. S. *Richmond* at League Island, and undoubtedly received the infection from a draft of men transferred from the U. S. R. S. *Vermont* at New York, where the disease was endemic.

The 5 cases of mumps were all admitted from the U. S. S. *Brooklyn* at League Island during the month of December, soon after the ship was commissioned. Four of these patients were from the draft of men sent from the U. S. R. S. *Vermont*, on board which parotitis was epidemic at the time of their departure. The fifth case, although admitted from the *Brooklyn*, had been transferred to that ship from the U. S. R. S. *Richmond*, and evidently, therefore, received the infection on board the latter, indirectly from the *Vermont*.

These cases were all isolated, in so far as that was possible with the means at command, in the upper and distant wards of the hospital. But their isolation being incomplete, the necessity for a pesthouse, in a detached situation, for the treatment of contagious diseases, as recommended by my predecessor, is again emphasized.

It has been suggested that a building for the reception of such cases could be constructed upon the stone walls forming the present storehouse, formerly the ice house, and drawings and specifications have been prepared with that end in view. This would provide a ward 29 feet 6½ inches by 28 feet 6 inches, affording an air space of about 7,875 cubic feet, accommodation for 9 to 12 beds, with nurse's room 7 feet 9 inches by 9 feet, kitchen 6 feet 3 inches by 9 feet 7½ inches, and bathroom 5 feet by 7 feet 9 inches; two entrances, front and rear, opening into vestibules, with ample light, ventilation, etc. The location is in close proximity to the laundry, and, as it is in contemplation to introduce a steam disinfector in the latter, direct connection could be had therewith through the medium of a chute, thereby avoiding any roundabout transportation of all articles requiring disinfection, and the consequent danger of spreading contagion.

The brick building in question, complete with all necessary appliances and fixtures for steam heating, electric and gas lighting, bath tub and water-closet, wash basin in nurse's room, kitchen sink, the requisite plumbing, etc., could be erected at an estimated cost of $4,094.

The site selected for erecting this structure, however, can hardly be deemed a safe one, by reason of its proximity to the laundry on one side and the kitchen and general mess room on the other, its distance from the former being but 12 feet and from the latter 27 feet. Being located nearly due west of the two last mentioned and south of the former, the danger that infection might be carried through open doors and windows when the winds are favorable at once becomes apparent. The safer and wiser course to pursue, therefore, would seem to be to select a new site on the unimproved tract west of the hospital, where sufficient land for the purpose indicated could be taken at a distance of 125 feet from the hospital proper, and therefore free from the objections previously stated. The early erection of the structure in question is earnestly recommended as a work of prime necessity, and the expense attending the same will not, it is believed, exceed the estimated cost ($4,094) of the first-mentioned building, although that is a matter which can only be definitely determined when a plan is adopted.

REPAIRING.

The pavement surrounding the hospital has settled in many places, and much of the curbing is out of line, threatening to cave in at the areaways in front of several of the basement windows. At the north end of the hospital the flagging lining the incline leading to the basement floor is much displaced, permitting the soil beneath to wash out during rains. The wooden area steps have rotted and should be replaced by stone ones, to be permanent.

The rubble and curbing forming the driveway at the engine house and the cobblestones under the coal sheds are much disarranged and the floor planking rotten. It is recommended that the narrow sidewalk with its curbing in this locality be dispensed with as useless; that the rubble of the drive be relaid with Belgian blocks and the latter carried up to the wall of the engine house, and that the floor of the coal sheds be paved with asphalt blocks, the same as the roadway along the front of the hospital, discarding the cobbles and planking. The drive between the laundry and Sunderland avenue wall is also much out of repair, and as it is never used for driving it is recommended that the ash bin in that locality be dispensed with as needless and the greenhouse, which is small and overcrowded, be extended in that direction a distance of 50 feet, leaving a passageway 4 feet wide between it and the laundry. This improvement could be made at a comparatively small expense.

The driveway west of the hospital branching from main road to the rear gate and leading to the storerooms in the basement, which is traversed by all vehicles bringing supplies to the hospital, is unpaved, and in dry weather dust raised by winds and the passage of teams is carried into the hospital doors and windows. Asphalt blocks would be the most desirable pavement in this locality, as being noiseless and most easily kept clean, and the improvement is urgently recommended.

The present arrangement for furnishing drinking water to the hospital, which has been in use for four years past, is very unsatisfactory. A jacketed boiler of about 150 gallons' capacity is suspended from the ceiling of the kitchen. This is kept filled with water from tanks in the attic, into which it is pumped from the street mains, and a pipe leading from the boilers in the engine house furnishes the steam which is intended to raise the contained water to the boiling point, thereby sterilizing it. From this cylindrical tank the presumably sterilized water, controlled as to quantity by a globe valve, is led by an iron pipe through a partition into a rectangular galvanized iron tank of 50 gallons' capacity, located in the china closet of the main mess hall on the first floor, in which the hospital's stock of crockery is kept. This tank has a wooden cover, loosely laid on. Thence the water is led through another partition into a large refrigerator, located in the hall on the main floor of the hospital, where it is cooled by circulating through coils of pipe immersed in ice and whence it is drawn off by stopcock. Now it is not infrequently the case that the water in the jacketed boiler is not raised to the boiling point and that consequently any disease germs which may be contained therein remain undestroyed. Again, the loose cover on the tank in the storeroom admits of the ingress of ants, roaches, etc., which have even been found in the tank when cleaned, which is necessary weekly or more often, the frequency depending upon the condition as to purity of the city's water supply. Moreover, this insufficient covering permits entrance into the tank of atmospheric dust, fumes from cooked provisions served in the adjoining mess room, deleterious gases, etc. It frequently happens when the supply in this tank is renewed that the vapor from the heated water rises in clouds, filling the room, cracking the glass and crockery stored there, injuring the plastering, on which it condenses, etc. Most important of all, no means have been provided for filtering, and the necessity therefor is apparent and indispensable.

The water supplied by the municipality of this city, at nearly all times of questionable potableness, is notoriously offensive to sight and to taste when the streams from which it is drawn are swollen by rains. Loaded, during these periods, with foreign substances—culm from the coal regions, mud, and organic matters washed from the overflowed river banks and bottoms, etc.—it is unfit for even laundry or lavatory purposes, much less for culinary or drinking uses. At times, during seasons of drought, it is offensive to smell and taste, and it is hardly questionable that deleterious consequences are likely to and do result from its use. Under the circumstances, it is earnestly recommended that the present cumbersome and inefficient apparatus be dismantled and that Pasteur or other filters, simple in construction, easily cleansed, and effective in furnishing an adequate supply of pure water for all purposes, be substituted.

Since writing the foregoing I have had interviews with the Philadelphia agent for the Pasteur-Chamberland Filter Company of Dayton, Ohio, sole licensee in the United States for the Pasteur germ-proof filter.

This company has just installed in the kitchen, dining room, pantry, and first, second, and third floors of the Naval Home, and houses "A" and "H," respectively, twelve of their filters, of varying capacity and with tanks to correspond.

Asked to give estimates for supplying this hospital with the filter in question, the agent has furnished me with the following: For use in the kitchen, one No. 18 direct-delivery Pasteur filter, used in connection with a 50-gallon storage tank, made of No. 18 galvanized iron, with close-fitting lid, making all necessary attachments of the filter and tank to the supply and waste, for the sum of $95. For the drinking-water supply, one No. 18 direct-delivery Pasteur filter, in connection with one 15-gallon heavy cast-iron, porcelain-lined storage tank, for the sum of $100.

The above is to be placed in the china closet, connected with the pipe supplying the coil in the stationary cooling box now in use in the main hall of the hospital.

For use in the bacteriological laboratory a No. 6 tube, direct-delivery filter, in connection with a 15-gallon tank, complete with all necessary attachments to the supply and waste, and mounted in the photographic dark room adjoining the laboratory, for the sum of $62; making the total cost for the three filters $257, and the sizes being of sufficient capacity to furnish an abundant supply of pure water.

For laundry purposes the agent recommends a No. 3 Bowden filter, and guarantees it will furnish perfectly clear water in sufficient quantity to answer the laundry purposes of the hospital. This he agrees to install, making all attachments to the main pipe, for the sum of $135.

The proposals above outlined are respectfully submitted to the Bureau for its favorable consideration.

The location of the present paint room in the basement is decidedly objectionable by reason of its proximity to one of the steam-heating coils, whereby the apartment becomes heated to such an extent as to blow the stoppers from the paint receptacles, and necessitating keeping the window open at the risk of having the room flooded by rains or freezing the water pipes in proximity, during cold weather. More than this, there is the probability of fire, whether of spontaneous or other origin, from the storage of paints, oils, varnish, etc., so that the removal of these inflammables from the main building to a desirable place at a safe distance, therefore, would seem imperative. I have selected such a site in the old stone (ice) storehouse, where a partition can be run from the dead house to the east wall, inclosing an apartment 21 by 12 feet, amply large enough both for the storage and mixing of paints, and free from the objections mentioned. A skylight, 6 by 3 feet, similar to the one in the dead house, would furnish all necessary light.

In the event of the Bureau's approval ot this change I will be glad to prepare requisition for the necessary materials and proceed with the work.

The main stack for the boilers, and other brick and stone work about the hospital and outbuildings need pointing up, and the loose and broken capstones on the chimneys need repairing.

A great annoyance is experienced in the boiler room by reason of the fact that no means have been provided for the escape of the steam vapor, gases, and dust raised in wetting down the cinders and ashes hauled in cleaning fires, which, besides covering everything within reach, find their way into the laundry room adjoining, to the discomfort of the employees there and injury of wash clothes.

A ventilator, 4 feet square, cut through the ceiling and extending through the roof would give vent to the boiler room, permit the escape of the gases and dust and remedy the trouble. The expense involved would not be great, and the improvement is much to be desired.

The skylights and roofing of the various buildings are considerably out of repair, causing leaks and consequently damage at several points, and need general overhauling. The last repairs to the tin roofs of the coal shed and main building were made about three and one-half years since. The joints have opened in numerous places, requiring scraping and resoldering and a section of the tin roof at the north end of the main building has so much deteriorated as to require renewal. The last general repairs to the slate roof of the engine house were made seven years since, and its condition is such that it will probably be found more economical to reslate it entirely than to patch the many broken places.

The main building was repaired about three years since, and recent inspection shows that new slate to the estimated number of about 1,000 are needed to replace broken sheets, while the tin covering at the hip will probably need renewing in its entire length.

The casing, sills, and sash of the skylights and dormer windows on the third floor, more especially at the north end of the building, are much shrunken and in places rotten from exposure to the weather, permitting rain and snow to drive in. After making the necessary repairs, it is suggested that a tin facing be put over the outside exposed woodwork to protect it from the weather and guard as much as possible against a recurrence of the evil.

All windows, doors, cornices, etc., and all trimmings of iron and wood on the outside need repainting, about three years having elapsed since it was last done, and this work will require to be performed by contract.

By reason of the proximity to several manufacturing establishments and the line of the Baltimore and Ohio and Pennsylvania railroads, all of which burn bituminous coal, much annoyance is experienced from the smoke.

Four years have, nevertheless, elapsed since any extensive interior painting has been done, and consequently most parts of the hospital are sadly in need of it. The initiative in this direction has already been taken, and it is the intention to continue as time and opportunity will permit until it is completed.

The large central hallway in the basement, even on the brightest days, is very dark and gloomy, the only light penetrating the place being admitted through narrow windows at the sides of the doors, quite insufficient for the purpose and on cloudy days necessitating the lighting of the gas burner in that locality. It is proposed to cut out the upper panels of the doors just mentioned, also those opening into the bakehouse and purveyor's storeroom, and insert glazed sash, protected by wire netting, which will remedy the defect.

I desire to emphasize the suggestion of my predecessor as to the necessity of separate accommodations for the temporary care of patients requiring restraint or confinement. The cell now used for the confinement of delinquents, being situated in the basement, is unsuited for the purpose by reason of dampness and the consequent possibility of aggravating any disease, such as rheumatism, etc., with which the prisoner may be affected. With the construction of a pesthouse, as heretofore recommended, one of the smaller wards at either end of the hospital, now used for the accommodation of patients requiring isolation, could be subdivided and rooms fitted up for the care and safe-keeping of those cases requiring restraint or confinement.

I am informed that the kitchen range has never given full satisfaction, and that various alterations have been made from time to time without, however, effecting the improvements which were anticipated. The principal defect is back draft, which prevents proper combustion and drives the flames outward through the openings in the ash pit, and through the lids into the kitchen, necessitating the placing of sheet-iron fenders in front of the range as a protection to the cooks. This defect is probably due to the insufficient height of the chimneys, the wind, when blowing from certain directions, being deflected into them from the hospital building. An attempt has been made to remedy the trouble by extending the chimneys, the extension consisting of galvanized iron pipes surmounted by cowls revolving with the wind. But the elevation is still insufficient. In time the caps fail to revolve and the trouble continues. The dust flue, intended to carry off the fumes of cooking, is another defect, in that it is improperly placed and inadequate for the purpose. Furthermore, the range, which has been in constant use during the past ten years, is antiquated and worn out; the water backs, long since abandoned because burned out, remain in place with their useless attachments, and the great galvanized iron hot-water tank connected therewith, and no longer of any service, encumbers the kitchen. Similarly, two large copper coffee boilers, and two copper tea boilers, which have not been used for twenty-two years, have been allowed to remain needless fixtures in the kitchen and should be disposed of. With the view to a thorough remodeling of this department of the hospital it is suggested that a survey be held on the range, the chimneys, the abandoned apparatus mentioned, etc., and the Bureau's instructions to that effect are solicited accordingly.

Although the repairs and improvements detailed in the foregoing report may seem varied and numerous, it is evident from their nature that they are to a greater or less degree requisite for the efficient administration of the hospital, the safe guarding of the properties, and the thorough and satisfactory performance of the duties involved. While there may be no immediate necessity for some of them, there are others which would seem to require early attention, and, named in the order of relative importance, these may be stated as follows: Pesthouse, laundry disinfector, germ-free water supply, paint storage room, kitchen range, electric bells. Some of the repairs can advantageously be made only with the advent of spring, while other improvements may readily be deferred until such time as may be most convenient otherwise, and all are respectfully submitted to the favorable consideration of the Bureau.

REPORT ON NAVAL HOSPITAL, WASHINGTON, D. C.

By G. A. BRIGHT, *Medical Inspector, United States Navy.*

Twelve patients remained from the previous year. There have been admitted 136. Of this total, 112 have been returned to duty, 7 discharged from the service, 1 transferred to the Government Hospital for the Insane, and 2 have died. One of the last was an officer, with chronic epithelioma of the penis, recurrent after operation, with invasion of inguinal glands, and death by exhaustion. The other case was one of purulent bronchopneumonitis, affecting both lungs, with strong adhesions to diaphragm, etc.

The clinical points noticeable in the hospital records for the year relate to malarial fever, enteric fever, and appendicitis. During the year 1895 the admissions for malaria numbered 69; during 1896, 27, and it is remarked that the latter series was not only less numerous but less severe. The reasons for this are doubtless climatic, but are not easily defined more strictly. There seems to be good reason to connect them with the altered conditions of the flats in the East Branch of the Potomac, in close proximity to the navy-yard. At St. Elizabeth's Hospital, just opposite the navy-yard, the morbidity from malaria has very largely increased in the last few years. However, at points remote from the East Branch, as Fort Myer, the same increase is noted in the health reports, and is ascribed, in part at least, to other causes. Further, in the report to the District Medical Society for 1895, it is declared that malarial diseases have largely increased throughout the whole District.

Of enteric fever 5 cases have been received, all from Marine Headquarters, and all discharged as well. There is thus a presumption of a common local origin for these cases, but nothing more. No exact inquiry into this has been made; but the medical officer on duty at headquarters has had his attention called to the fact, though he has not traced the origin of the disease to a particular source.

Four cases of appendicitis have been treated, all terminating in complete recovery. Two of these yielded to rest and simple expectant treatment. In a third the evacuation of a considerable amount of pus was followed by a sinus which did not communicate with the bowel, and which persisted for many weeks. The fourth and gravest case presented much operative difficulty, and caused much apprehension as to the result. The appendix and a portion of the cæcum were found to be gangrenous. The opening into the bowel could not be entirely closed by sutures, and a portion of peritoneum was made to cover the gap. There was, however, an uninterrupted recovery.

During the year a new ambulance has been added to the equipment of the hospital. It is complete and modern, comfortably upholstered, and provided with a stretcher which slides into the rear of the ambulance on rollers. There is also an emergency case, as part of its outfit, containing instruments and medicines, together with canteens of water.

During the year one of the water tanks in the east attic, which had at various times received temporary repairs, was relined with lead, and the ceiling of the closets immediately underneath it, which had been loosened by recent leaks, was renewed; it is now again in proper condition.

By far the greatest improvement which has been made in the hospital is the installation of a complete operating room in correspondence with the present requirements of operative surgery. Hitherto there has been no place set apart for operations, which were done wherever it happened to be most convenient. The new operating room occupies the place of the old dispensary, which was removed to the adjoining room. The room thus vacated was then prepared by giving ceiling, walls, and floor several coats of paint specially manufactured for such purposes, and capable of being easily kept clean by scrubbing with antiseptics. Then there were introduced a steam sterilizer for dressings, a sterilizer for water for irrigation, and a sterilizer for instruments, all three being provided with Bunsen burners, and connected with the water supply of the house. Beside these a large porcelain sink, with hot and cold water taps, was put in. Abundance of electric lights was introduced about the walls and over the operating table. The latter is known as Boldt's pattern, a skeleton of iron with glass top affording any desired change of position, and easily kept clean. In addition there is a wheeled stretcher, and the usual apparatus of stands, tables, cabinets, and jars of glass and metal, and everything needed for such an outfit. Ventilation and supply of daylight are ample. There is not sufficient space to be used as separate etherizing and recovery rooms, but the need of these is not so urgent.

There is in contemplation a steam sterilizer for all soiled linen and bedding, to be located in the basement, as soon as the details can be arranged, this being complementary to the antisepsis of the operating room in the second story. Also in the near future a room in the basement is to be fitted up as a laboratory for chemical, microscopical, and bacteriological research.

Except as above enumerated, no considerable alterations or repairs have been made to the hospital property, which appears to be in good general condition.

One addition has been made to the number of employees, that of an ambulance driver, who is also the hostler.

The work of paving Tenth street has been completed since my last report. E and Ninth streets around the hospital remain unpaved, which adds to the noisiness of the neighborhood. The advantage of occupying an entire lot is detracted from by the fact that the noise and dust of four streets have to be endured.

The occasional benefit derivable from Vaughan's nuclein solution (nucleinic acid, 1 per cent for hypodermic use, 5 per cent for internal use) in early slow phthisis has been illustrated by further experience in one additional case, where there was a continuous gain, amounting to 8 pounds in seven weeks, which seemed distinctly due to the treatment, and then a loss of nearly 5 pounds under conditions apparently just the same.

REPORT ON NAVAL HOSPITAL, NORFOLK, VA.

By C. J. CLEBORNE, *Medical Director, United States Navy.*

During the year there were under treatment 320 cases, classed as follows: Parasites and parasitic diseases, 1; general infectious diseases, 94; constitutional disorders of nutrition, 3; diseases of the nervous system, 23; diseases of the visual apparatus, 9; diseases of the auditory apparatus, 4; diseases of the olfactory apparatus, 1; diseases of the digestive apparatus, 14; diseases of the circulatory apparatus, 14; diseases of the respiratory apparatus, 12; diseases of the motory apparatus, 15; diseases of the cutaneous apparatus, 17; venereal diseases and diseases of the genito-urinary apparatus, 104; injuries, 9.

The following operations were the subjects of special reports:

1. External urethrotomy for rupture of urethra.
2. Operation for appendicitis.
3. Paracentesis abdominis for extensive ascites; no recurrence.
4. Enucleation of one eye.

A case of appendicitis occurring in a hospital employee (a nurse) was not reported, as it was not included in the statistical report. The patient was taken sick with symptoms of ordinary acute indigestion. The next morning, after a restless night, marked local symptoms made clear the diagnosis of appendicitis. The fever lasted three days; then the temperature became normal, and the pulse was never above 90. For about four days everything progressed well, when, with increase of pain and recurrence of fever, a distinct tumor became apparent. Increase of pulse beat led to operative interference on the ninth day of disease. A small pus sac was found, emptied, and thoroughly irrigated. The general peritoneal cavity was not entered. A drainage tube was inserted. The appendix was not interfered with. For one week everything progressed favorably. Temperature was only slightly elevated. On the 8th day it became necessary to drain a pus sac which had formed. On account of the apparent unimportance of the procedure no anæsthetic was given. The incision was made and the dressing forceps passed through opening to grasp the drainage tube, when suddenly the patient became pulseless, and, notwithstanding immediate attention, death resulted. The post-mortem showed abscess cavity small and healing; peritoneum free from fluid, coils of intestines forming the anterior wall of abscess; only about 1 inch of appendix left, which allowed introduction of probe into its lumen, the remaining portion having become disintegrated or become part of the abscess wall.

Besides the work and improvements authorized by the Bureau and directed by the commandant, the following work has been satisfactorily and economically done:

GENERAL REPAIRS.

Repairing woodwork in hospital laundry, filling in and reconstructing space under clothes slides, relaying sleepers, and reflooring drying room; repairing road roller and shafts, laying new flooring and sleepers in hospital mess pantry, and repairing and replacing the shelving and heater stands; rebuilding river fence after two severe storms, repairing and reconstructing outside wooden coal shelter, reflooring four cells, digging post holes and setting up 22 new drying posts in laundry drying ground; repairing two hospital landing floats and gangways at Norfolk and hospital landings; repairing and repainting main gate fencing and baseboarding at Green street entrance; making and painting new grating platforms for settees in grounds; making, repairing, and reglazing all hotbed sashes and frames for farm and garden; repainting woodwork and flooring of hospital greenhouse; repairing hospital boats and renewing platform of old boathouse and planking of pier; rebuilding 324 feet brick river wall along beach; repairing and rehanging outside window blinds and patching up balcony at gate house; numerous small repairs to sides and decayed floors of old stable; making new feed boxes and tinning them; repairing and repainting baseboarding and pickets of front wooden fence of hospital; repairing pickets of farm fence; making mosquito frames and screens; reerecting the partition and sundry other repairs and carpenter work at pesthouse; patching up railing and planks of foot bridge; putting in new sash cords; erecting a partition, altering and rearranging rooms 9 and 10 to fit them for officers' quarters, thereby increasing the number of rooms available for sick officers, and providing a parlor, special bathroom, and water-closet for their accommodation; putting in and renewing necessary main steam piping in grounds between hospital and director's quarters; replacing rusted pipes and repairing leaks in connections, joints, and steam pipes in wards of north and south wings of hospital, boiler house, laundry, etc.; repainting the boiler house, smokestacks, etc.; putting in new steam piping and thus connecting the heating system of north and south wings of hospital so that their wards can be heated together or separately; repairing hospital pantry steam drum and sink; repairing old well pump and connecting Worthington pump with old and new driven wells; driving 1½-inch well some distance from the old ones and connecting by 3-inch piping all the driven wells in one system, and also independently; cleaning out, repointing, and replacing well pipes of original wells, thus securing a good supply of water for boilers and tanks; put in and piped new system of hot-water heating for pesthouse; repairing main steam pipes from boiler house to south wing, and putting in pressure tanks in pesthouse; draining, laying out grounds, trimming trees, and removing stumps; finished painting outside of director's house and inside of officers' quarters at hospital; retouching corridors, floors, walls, baseboarding, doors, window frames, etc., in north and south wings of hospital; painting mess pantry, nurses' dining room, water-closets, lavatories, and general offices; making and painting partition at pesthouse; decorating operating-room walls and woodwork; painting parts of outbuildings; erecting and painting laborers' outsheds in grounds; painting telephone poles; revarnishing and repainting old furniture, bedsteads, ward tables, and carts, plows, and other agricultural implements.

REPORT ON NAVAL HOSPITAL, PENSACOLA, FLA.

By H. N. T. Harris, *Passed Assistant Surgeon, United States Navy.*

There have been no patients admitted into this hospital during the year.

The following work on hospital buildings has been completed by the Department of Yards and Docks:

HOSPITAL WARDS AND DISPENSARY.

The wooden shingles on this building were stripped off, the sheathing repaired, and the open spaces between sheathing closed in, covering the roof with galvanized metallic shingles. The chimneys were repointed, caps relaid in cement, and all flashing around same renewed in copper. The guttering and leaders on main and veranda roofs have been thoroughly repaired, including the renewal of 46 feet of guttering. All doors and blinds have been overhauled, window sash have been reglazed where broken and fitted anew with sash cord. All veranda sills, joists, flooring, fascia board, latticework, ballusters, and rails have been replaced where decayed and columns repaired where needed, and all exterior woodwork, including veranda floors, have been painted in two-coat work. The plastering in wards and dispensary has been thoroughly repaired, sized, and painted in two-coat work, including one coat on ceilings. All fireplaces have been repaired and grates reset, casting new ones in place of such as were burnt out, and all brick steps have been repaired.

OFFICER'S WARDS AND SURGEON'S QUARTERS.

This building was reroofed and treated in the same manner as the wards and dispensary, renewing about 60 feet of guttering and 34 feet of leaders. The curb of brick cistern at rear and partly under veranda has been leveled up and fitted with new framework and cover. The work of painting exterior and interior was the same as reported on former building.

WATER-CLOSETS FOR WARDS.

The roof framing for this building was renewed throughout, sheathed and covered with galvanized metallic shingles; the seats have all been renewed, fitted with hinged covers, boxes, shutters, etc., complete; all woodwork has had two coats of paint, and new brick steps were built.

WATER-CLOSET, SURGEON'S QUARTERS.

The roof was found to be in a worse condition than expected. Shingles had to be stripped off, sheathing repaired and covered with galvanized metallic shingles, and weatherboarding slightly repaired; also blind and latticework, including new boxes and shutters. The exterior received two coats of paint.

KITCHEN.

The wooden shingles were taken off, sheathing repaired, and roof covered with metallic shingles, and flashing around chimney renewed.

The gutters were renewed in about 35 feet, including new leaders throughout, and two window shutters were put up anew, and windows glazed where broken. Veranda sills, joists, and flooring have been put up anew, and all exterior woodwork, including veranda floor, has had two coats of paint. Brick steps have been repaired.

ICE HOUSE.

The decayed lower floor has been torn out and renewed, both as to joists and flooring; the slate roof has been repaired, also windows and doors.

GATES IN WALL INCLOSING GROUNDS.

All the gates have been repaired, strengthened with braces, and painted in two-coat work.

MISCELLANEOUS REPAIRS.

Wells in hospital inclosure have been covered with substantial plank. The floor of the house formerly used for necropsies was laid in brick and cement, for storage of coal.

The total cost of labor was $1,282.84.

After removing débris of lower floor of ice house and cleaning out what was originally the ice pit, it was found to be in excellent preservation, well lined with cement, and capable of being utilized as a cistern—16 by 16 feet, by 7 feet depth. Capacity, 13,400 gallons.

Since the completion of this work the hospital grounds have been cleaned and the place generally put in good condition.

I have merely to add, in reference to the work already referred to, that it has been done in a manner which, in my opinion, is entirely satisfactory.

REPORT ON NAVAL HOSPITAL, MARE ISLAND, CAL.

By G. W. Woods, *Medical Director, United States Navy.*

During the year, 150 apprentices were shipped on board the U. S. R. S. *Independence*, and this has eventuated in the admission of many cases of diseases, habitual to youth, presenting a novel feature in the annual report of cases. These have included 11 of rubella, 5 of parotitis, and 1 of diphtheria. There have also been 10 cases of pneumonia, occurring chiefly among these young recruits.

The operations of interest for the year have been as follows:

1. Amputation of middle third of thigh, performed by P. A. Surg. C. J. Decker, with good recovery. The patient was a rigger in "equipment," who was later admitted as a supernumerary, and remained in the hospital until complete canvalescence was established.

2. Removal of inguinal glands for suppurating adenitis.

3 and 4. Two operations for removal of deep-seated tubercular glands of neck.

5 and 6. Removal of hæmorrhoids.

7. Vulnus laceratum.

8. Caries of ankle joint.

9. Unguis involutus.

10. Fracture of cranium. In this case epilepsy succeeded healing

of excessive scalp wound and union of fractured bones. Later the patient died, after discharge from service, but was buried from the hospital, and so an opportunity was offered for investigation. The necropsy showed that, although death was sudden, patient having fallen and become unconscious, he was affected with acute pneumonia. He probably had an epileptic seizure, and the cause of this was demonstrated to be a colloid tumor near the petrous portion of the temporal bone, a sequel of the cranial fracture and injury to the brain.

11. Extirpation of lipoma.

12. Excision of suppurating sinus.

13 and 14. Urethrotomy. Two operations.

15. Circumcision.

16. Operation for fistula in ano.

17 and 18. Two operations for evacuation of hepatic abscess. These two operations were in the same case, the result of malarial disease and long residence in the tropics, especially a recent prolonged stay on the Central American coast. An aspiration was first made, removing 18 ounces of pus, and later, after inflammatory adhesion had been obtained between peritoneum and parietes, an incision was made into the substance of the liver, which caused evacuation of a still larger amount, while somewhat later a deeper incision opened up a pocket which liberated 40 ounces of fetid pus mixed with blood. Since this last incision there has been a constant flow mixed with necrotic glandular tissue, and patient has been gradually failing.

IMPORTANT NECROPSIES.

1. A supernumerary, formerly apprentice, United States Navy, died from phthisis pneumonica chronica March 15, the immediate cause of death having been an acute pericardial effusion, with consequent "heart failure." At the necropsy both lungs were found riddled with vomicæ, the rest of the lungs being nearly a solid mass of tubercular deposit. The pericardium contained about a pint of fluid, the result of recent inflammation, but the most singular feature of this case was the atheromatous condition of the arteries—although patient was but 19 years of age—which were all, especially the aorta, more or less rigid with calcareous deposits; at base of aortic origin a mass of granular calcareous particles was extruded by pressure, as though from a cylindrical mold, and probably from the coronary artery.

2. A quartermaster, third class, died of aneurysma of the arch of the aorta November 26, after a stay in the hospital of two years and five months. The aneurism was diagnosed at an early period, and slowly increased in size, with constant absorption of the costal covering, the only treatment being absolute rest, in the recumbent position. During the latter period of his illness he suffered much from pressure on the intercostal nerves, relieved by the constant use of morphia hypodermatically, and as the absorption of the ribs progressed a rupture was expected to occur at any moment, but he seems to have died from some interference with nutrition, through pressure on important nerves, principally the pneumagastric.

3. A private marine died December 10 of nephritis chronica, complicated with catarrhus intestinalis chronicus. From the moment of admission no nourishment seemed to be assimilated, and he gradually failed and died. The necropsy demonstrated parenchymatous nephritis, cirrhosis of the liver, tubercular deposits in the mesenteric

glands, and ulcerations of the entire intestinal tract; but the most singular feature was the great atrophy of the spleen, which weighed less than 2 ounces.

REPAIRS, ETC.

During the year there has been the usual routine renovation, including painting and repairing roofs, painting of the whole of the interior of the hospital, repairs to engine room and chimneys, repairs to boilers, also to fences, and extensive work on roads.

As regards the furnishing of the hospital, I have made an effort to complete this, and can now pronounce the building as completely furnished with all that is required.

All furniture requiring it has also been reupholstered and thoroughly repaired, and 36 ward chairs purchased. Four new water-closets have been added, rubber matting laid in the wards and basement hall, and new cocoa matting in all the other halls.

During the year a new capacious market wagon has been purchased and a horse to take the place of the one unfortunately killed by lacerations, through becoming entangled in a mass of fallen telephone wire while turned out to pasture last spring.

The ambulance has also been thoroughly repaired and lined, and can scarcely be improved upon for the purposes. In might be, however, desirable to have a small one-horse ambulance of lighter construction to bring up single patients not seriously ill and not requiring stretcher or attendants. This, however, is not a necessity.

The great improvements of the year have been the establishment of a perfectly equipped operating room, a room for bacteriological investigation, which I will soon be able to put in commission, and the renovation of the cemetery.

The furniture and apparatus of the operating room is second to none within my knowledge. It is to be regretted that, on account of the hospital not being supplied with gas, and the electric light not being available save at night, it was necessary to have the boilers supplied with heat from a petroleum apparatus, which requires to be most carefully attended by a machinist when in use, the feed frequently clogging.

The illumination of the room at night is perfect, and superior to daylight. The illumination of the operating table is by means of an enameled cone containing four 32-candlepower lights, and by a smaller one for exploring special portions of the body, both balanced on sliding cords, so as to be raised or lowered and adjusted to position to suit the convenience of the operator.

The enameled paint ordered to be applied to the walls and floors has not been a success as regards the latter, although carefully put on, according to directions, and allowed to dry. As soon as it was walked over, even by those in slippers, it commenced to be detached, and I was compelled to put down perforated rubber mats, as in the Waldeck, of San Francisco, where the same difficulty has been encountered. I am now experimenting with a new variety of enamel paint for the floors.

The appropriation for the improvement of the cemetery having become available and the work authorized, commencement was made August 1 under contract, and the work completed in less than three months. The requirements of the contract were: "Labor and material for widening approaches and repairing and painting all gates and fences; for making graveled roads and paths, building a wall at foot of upper terrace, properly grading the whole area, and planting appropriate shrubbery at naval cemetery, Mare Island, Cal."

In accordance with these terms, the approaches were widened and two sliding iron gates were introduced as a substitute for the old wooden ones, and the entire inclosing fence repaired and painted, the south main avenue was broadened and thickly graveled; the terrace walls were repaired, the lower one being lengthened to the entire width of the inclosure, and a broad flight of concrete steps built to reach both terraces.

The whole area was carefully graded and the graves properly aligned, after which the headstones, 275 in number, corresponding in character to those erected in national cemeteries, were placed in position, each supported on a base of artificial stone.

So far as the amount of the appropriation permitted, the work was completed to my entire satisfaction, but it did not permit of the completion of the road from the north gate, the straightening and addition of new supporting bases to certain heavy monuments which had sunk out of line, and the planting of the shrubbery. I have therefore to recommend that the road referred to may be built and shrubbery planted, and that both roads or avenues be provided with brick-lined gutters to carry off the rain during the winter season, which rushes down the steep hillside on which the cemetery is located in such volumes as to create washouts in the road and carry off both gravel and soil; also that the heavy monuments be straightened and new supports of concrete or artificial stone added.

I may add that in the performance of the work the terrace walls were extended beyond the limits originally contemplated. For the sake of symmetry, several bodies were removed to bring the graves into proper line and much other work done.

To save reiteration, I beg leave to refer to my report of 1895, and would again urge the desirability of erecting a carpenter shop, located at a distance from the hospital, as therein explained and for the reasons stated.

I also beg leave to refer again to the subject of our water system, in the same report, to which I have little to add, but beg that it may again be considered by the Bureau, and, if possible, in conference with the Chief of the Bureau of Yards and Docks. At the time of preparing that report I gave a careful consideration to the subject, and have nothing to add to my argument. Since that date a new submarine pipe of larger caliber has been prepared, which is to take a straight course under Mare Island Straits, and an attempt was made to lay it during last October, but the tide not serving, it was drawn from its course, twisted and broken, and recovered with much difficulty. It has since been landed, and an attempt will shortly be made to relay it. This may increase our supply of water, but I do not think we can secure an adequate supply for fire purposes and for filling our reservoirs without pumping until we have direct pipe connections with Fleming Hill reservoir. Should this ever be realized, the value of 125 tons of coal expended for pumping purposes would yearly be saved to the Bureau of Medicine and Surgery.

To reiterate briefly again, I would respectfully refer to same report of 1895, in which the necessity for an improvement in our elevator or the substitution of a new one is urged. The present elevator is cumbrous and dangerous, and is worked by hand power. Improvement in its construction and the substitution of electric or hydraulic power seems to be demanded.

Our water-closet floors, now covered with zinc, are a source of dissatisfaction, never appearing neat and tidy. No paint will adhere, not even enamel paint, with which I have experimented, and I would recommend that they be covered with some form of inexpensive tiling, and that authority be given to apply the same covering to the morgue and bathrooms, now floored with wood.

In previous reports I have asked for an increase of employees and for an advance of wages in some cases, and in my report for 1892 presented a complete schedule of what I deemed a full complement for this hospital, with the proper wages, based on the rates of pay current on this coast.

Since making these suggestions an additional nurse has been authorized and appointed, and a fourth nurse has recently received temporary appointment, by authority of the Bureau, for the first quarter, 1897, to meet an emergency of serious cases requiring special care.

As the work of the hospital has much increased with an augmented average of patients, the establishment of the new operating room, and the bacteriological department, about to be put in commission, I would ask that this recent appointment be made permanent, and the same nurse will be delegated to perform the special duty of attendance on sick officers, for which no special provision has ever been made. To these duties might be added those of special diet nurse, a position never filled in this hospital.

In the schedule referred to I asked that the pay of the apothecary be increased to correspond to that of the apothecary of the yard, his duties being of equal if not greater importance. This was the pay authorized when this hospital was established, and why or when it was reduced I am unable to determine.

Should the admirable naval hospital corps bill prepared and submitted by the Surgeon-General in February, 1896, become a law, this matter would be corrected, and I trust, when realized, that in the detail for this hospital two apothecaries may be included, one to act as purveyor and the second to have charge of the pharmaceutical work more particularly.

A night watchman, to act also as master at arms, seems to be a necessity, and in the early days of the hospital this position was considered so essential that it was the first appointment made. The hospital and its outbuildings, including the medical director's residence, are remote from the yard, and should be under watch and observation during the night as well as the day.

I have but one other suggestion to make in this regard, and that is the appointment of an additional scrubber, who could assist our launderer, whose work is often of such magnitude that he has to employ an assistant at his own expense. The care of the halls, windows, sick officers' rooms and mess room, steps, and pavements is now attended to by one scrubber, and the work is entirely too great for one man to perform to my entire satisfaction.

In conclusion, I would refer to the establishment of a new board room. With the rearrangement of our operating room, which had hitherto been the place of meeting for examining boards, I have been compelled to seek other quarters for this purpose, and have selected a large, well-lighted room in the third story, which has been put in order, and to this the furniture, books, and archives of the two boards have been transferred.

REPORT ON UNITED STATES NAVAL HOSPITAL, YOKOHAMA, JAPAN.

By Paul Fitzsimons, *Surgeon, United States Navy.*

Eighteen cases of malarial fever were admitted and readmitted, principally from the *Olympia.* The type was mild, but rebellious to treatment. Of 3 cases of febris enterica 2 were returned to duty and 1 died. The last has been reported in detail, and was preceded by febris remittens. The case was admitted to the list on the *Detroit* May 7, with a temperature of 104.6° F.; the remissions varied from 2° to 3° until the 20th, when it fell to normal, and then took the typhoid curve, which was fully developed on the 25th, when admitted to the hospital. Of the five cases of catarrhus intestinalis chronicus, 4 appear to have originated on the station.

Class XI furnished 27 cases, including 5 cases of chancroid and 8 cases of syphilis consecutiva. One case of arthritis gonorrhoica, returned to duty, required fixation of the knee in plaster; the adhesions were finally broken up under ether.

A case of fistula urinalis was interesting, because of the disappearance of a resilient stricture when the patient was fully etherized. On admission there was a perineal fistula an inch above anus, near the raphe. Three strictures, from 1½ to 4 inches from meatus, were cut, and kept at 30 F., the normal size of the urethra. The fistula rapidly closed and the man was sent to duty. He returned in six months with the same fistula reopened. An elastic resilient stricture was made out, deep in the membranous urethra. This resisting dilatation and another swelling appearing in perineum, external perineal urethrotomy was performed. A bulbous sound (No. 30 F.) was passed into meatus and brought out through the wound and 34 F. (steel sound) was passed back into the bladder. Three days after No. 30 was arrested in the prostatic urethra. The patient was etherized again and, as it was desirable to give as little ether as possible, the examination was begun before relaxation was complete, when the finger was arrested in the membranous urethra by a tight elastic ring. This was incised with a prostatic knife, and no further trouble was found in passing the sound into the bladder.

On September 26 an operation was performed on an hydatid cyst of the liver. After incising the abdominal wall, the finger was swept freely over the tumor and no adhesions found. Sixty ounces of fluid were drawn off and a stout ligature passed, holding the sac against the abdominal wall. An incision 1½ inches long in the sac was followed by profuse bleeding, finally checked by pressure forceps, applied around the circumference of the incision, and as each forcep was removed a stitch was passed through the cyst wall and the inner edge of primary wound. Two stitch abscesses appeared on the 29th. The ligatures were of chromicized catgut, which had been washed in alcohol and in bichloride solution 1 to 100. Temperature rose daily in the evening to 100°-102° F. Drainage was free, but siphonage was applied and acted well until October 17, when the cavity was so small it was no longer useful. The lining membrane began to come away in thin discolored layers on November 30, and on December 30, while irrigating cavity, a thick white membrane presented itself in the wound. On combining irrigation with traction, 18 inches square of membrane was extracted, in two pieces. It was highly elastic, curling tightly when cut in strips. Under one-seventh objective it showed a finely dotted appearance and was marked with delicate parallel lines. One scolex was found, and several hooklets. The fluid of the cyst, after having flowed a short time through the canula, had been collected in a sterilized Erlenmeyer's flask. Stroke and puncture cultivations on gelatin and agar proved sterile. Microscopic examination was negative. For the past month the temperature in this case has been normal, and the patient sits up daily. A fistula still exists, about 4 inches long, admitting a No. 4 catheter.

No repairs have been made necessary by storms or earthquakes during the year. The lower ward is in excellent condition; the walls have been replastered, all the interior woodwork and bathroom repainted, the wooden panels of three large doors replaced by glass, a bath tub, with running water, arranged, and a new ceiling put in, making the ward much cooler in summer. The flooring and beams of the verandah in front have been renewed. The upper and lower halls of the main building have been repapered and new matting laid down. The wooden panels of several doors have been replaced by glass, in order to increase the light. The beams and flooring of the front verandah have been renewed. The sill beams and flooring of the coal house have been entirely renewed, and partially so in the cell. All of the bedsteads have been painted. The exterior of all the buildings, except the employees' quarters in the rear, has been freshly painted, and presents a uniform and neat appearance, which was impossible when the work was done in patches. The pump ordered by the Bureau from San Francisco has proved satisfactory, being easily worked by one person and not getting out of repair. The upper ward is cracked badly, and the plaster should be renewed. The woodwork in the officers' rooms should be repainted.

Smallpox is more or less prevalent, but has been in no sense epidemic here. The Government closed all the vaccine farms a few months ago, and the virus can only be obtained now from one official source, the whole business being under Professor Kitasato. Cholera has prevailed to some extent, and although a few cases are reported in Yokohama from time to time, the disease never succeeds in making any headway.

REPORTS ON CRUISING SHIPS.

REPORT ON THE U. S. FLAGSHIP SAN FRANCISCO.

By H. J. Babin, *Medical Inspector, United States Navy.*

The general health of the ship's company has remained good during the year, notwithstanding exposure to the debilitating influences of the continuous heat and humid atmosphere during the summer months at Mersyn and Alexandretta, on the Turkish coast.

There has been but one death on board, and that was caused by acute miliary tuberculosis.

During the year the *San Francisco* spent three hundred and twenty-five days in port and forty-one days at sea and visited the following ports: Smyrna (twice), Salonica, Piræus, Naples, Genoa (twice), Messina, Mersyn (four times), and Alexandretta (twice). The above ports were free from epidemic diseases at the time of our visits, except Smyrna, where smallpox prevailed extensively during the year, the mortality from the disease at that port having been as follows: January, 18; February, 9; March, 15; April, 17; May, 32; June, 57; July, 87; August, 100; September, 97; October, 76; November, 60; December, to the 26th, inclusive, 39. No general liberty was granted at this port until the ship's company had been vaccinated. The success attending the vaccinations was unusual, 26 per cent proving successful. One case of varioloid developed on board and was transferred to the contagious ward of St. Anthony's Hospital, Smyrna, where he remained twenty days, when he was discharged cured and returned to duty.

REPORT ON THE U. S. FLAGSHIP OLYMPIA.

By J. G. Ayers, *Medical Inspector, United States Navy.*

Summary of cruise.

Ports visited.	Date of arrival.	Date of departure.
Yokohama, Japan	November 9, 1895	January 21, 1896.
Kobe, Japan	January 22, 1896	January 22, 1896.
Nagasaki, Japan	January 24, 1896	March 3, 1896.
Woosung, China	March 4, 1896	March 9, 1896.
Side Saddle Islands, China	March 9, 1896	March 20, 1896.
Woosung, China	March 20, 1896	May 9, 1896.
Chefoo, China	May 11, 1896	May 20, 1896.
Vladivostock, Siberia	May 23, 1896	June 2, 1896.
Hakodate, Japan	June 4, 1896	June 6, 1896.
Yokohama, Japan	June 8, 1896	September 17, 1896.
Yokosuka, Japan	September 17, 1896	September 30, 1896.
Yokohama, Japan	September 30, 1896	October 12, 1896.
Kobe, Japan	October 13, 1896	October 15, 1896.
Chefoo, China	October 18, 1896	November 9, 1896.
Nagasaki, Japan	November 11, 1896	(Next quarter.)

About thirty-one days of the year were spent at sea.

The average complement for the year was 435, and the number of deaths 2—1 from aneurism of aorta, and 1 from asphyxia by illuminating gas. The total of cases invalided from the ship was 29, shown as follows, of which 23 returned to duty (this includes 4 cases treated for a while at the Shanghai general hospital):

Disease.	To naval hospital at Yokohama and Shanghai general hospital.	To United States.	Returned to duty.	Remarks.
Febris intermittens	1		1	
Febris remittens	13		13	
Catarrh. intestinalis chronicus		1		Was in hospital also.
Hæmorrhois	1			Still in hospital.
Hernia		2		For discharge from service; still in hospital at Yokohama.
Echinococcus (of liver)	1			Recovery from operation performed there.
Tuberculosis pneumon. chronica	1			Discharged from service on the station.
Stremma	1		1	
Syphilis consecutiva	3		3	
Chancroid	3		3	
Adenitis inguinalis	1		1	
Cystitis	1		1	
Total	26	3	23	

The number of different persons of this ship who have contracted venereal disease since joining this station, November 9, 1895, is 205. The following tabulated statement gives a summary of venereal diseases treated in 1896, and also since arrival on this station:

Disease.	Total number of cases treated since November 9, 1895.	Number of cases admitted to the sick list in 1896.	Treated in hospital in 1896.
Gonorrhœa	141	7	0
Epididymitis	30	30	0
Orchitis	1	1	0
Urethræ strictura	5	5	0
Cystitis	2	2	1
Arthritis gonorrhoica	1	1	0
Chancroid	62	6	3
Adenitis inguinalis	20	20	1
Paraphimosis	1	1	0
Syphilis	17	7	3
Total	280	80	8

There has been no case of cholera or variola. The number of vaccinations was 839, many of the crew having been vaccinated two or three times within the year. The percentage of success was 43.86. The bovine lymph used was obtained, preserved in glass tubes, sealed with wax, from one of the several establishments for its production under the control of the Japanese Government, and was of excellent quality, as shown by the large percentage of success.

That mostly used at Chinese ports has been lately supplied from a French establishment at Saigon, and is also reported to be very good. Hongkong has now a supply from a local source.

The general health of the ship's company for the year has been very good, except the existence of many cases of venereal diseases, and some 24 cases of remittent fever, contracted from exposure to local influences during the stay at Woosung in March, April, and first part of May, that region being low, flat, and to some extent marshy. This fever was but little controlled by quinine, even to the extent of 3 or 4 grams daily, or by large doses of Warburg's tincture. It continued in most cases three or four weeks, and convalescence was protracted in some cases many weeks and interrupted by mild relapses or return of slight fever. However, it was not pernicious, and high temperatures were infrequent and not lasting. A subsequent change to the climate of Chefoo and Vladivostock was of great benefit to the crew.

The following regulations, among others of a sanitary naturé, have been established by the commander in chief:

> As little water as possible will be used for washing the decks, at all seasons of the year, and work of this sort must be finished and the decks dried in the briefest possible time, and, except under unusual circumstances, before 8 a. m. The drenching of the upper deck or main deck in cold weather is to be especially avoided. The berth deck, or parts of the main deck inclosed by a superstructure, will be quickly wiped over with wet swabs, using fresh water, preferably warm; this will be done as often as necessary on parts of the deck that can not be kept clean by sweeping. The habit of keeping the decks as tidy and clean as possible should be rigidly enforced, to reduce to the minimum the necessity for using water.
>
> Each armed boat will be fitted with a box to contain a small medical outfit. It shall be kept in charge of the officer of the boat.

The medical outfit will consist of—

1. Extract of beef, 1 jar. Stimulant for exhausted and wounded man.
2. Twelve pills of morphine sulphate, ⅙ grain each. To relieve pain.
3. Twenty-four pills of camphor and opium, ½ grain of each. To check diarrhœa.
4. Ipecac, extract fluid, ½ ounce. For emetic in cases of poisoning.

With full written directions and caution as to use.

5. Carron oil, 8 ounces, in two bottles. For burns and scalds (steam launches only).
6. One bottle cosmoline.
7. Whisky, 2 ounces. Stimulant.
8. One towel.
9. One wineglass.
10. One teaspoon.
11. Sublimated gauze, yard.
12. Patent lint, 1 yard.
13. Muslin, 1 yard.
14. Adhesive plaster, rubber, ½ yard.
15. Five bandages.
16. One tourniquet.
17. Common pins, 4 safety pins.
18. Scissors.
19. Antiseptic oakum, sufficient in each box to prevent breakage.

The above articles to be packed in a box 11½ inches long, 6¼ inches high, and 5½ inches wide, inside measurement. The box should be made of tough, dovetailed wood, with sliding cover, which should be held in place by a screw at end. The box to be marked on top of cover "Medical Emergency Box," and name of boat, a copy of this article to be pasted on inside of cover.

For this ship there are fourteen of these boxes, made of teak, and sublimated gauze is packed in pieces, 8 by 16 inches each, in 8-fold layer, for first dressing.

The addition of these to the two large and very thoroughly equipped expeditionary and boat cases furnished by the Bureau provides more than an ample outfit for boat service.

The following order was issued by the commander in chief June 22, 1896:

1. Until further orders, the following precautions against Asiatic cholera will be observed on board the vessels of the squadron at anchor in this harbor:

2. All provisions before being taken on board shall be inspected by a medical officer, and none shall be allowed on board that are pronounced unwholesome; the bumboat shall be inspected by a medical officer before any man is allowed to go into it.

3. No vegetables whatever shall be allowed on board, excepting such as are to be eaten well cooked.

4. All shellfish taken in this harbor, and all dried or salted fish cured in China or Japan, shall be prohibited. Deep-sea fish brought alongside alive in tanks may be permitted.

5. Fresh milk (except such as is thoroughly boiled), cream, all butter other than that imported in cans, and all icecream made on shore are prohibited.

6. Beef, mutton, and dressed poultry will be permitted, but must be purchased from regular and reputable dealers. Sausage meat, veal, and salt or fresh pork will not be allowed.

7. No fruit nor aërated water, except such as is deemed wholesome by the medical officer, shall be taken on board.

8. Cake, confectionery, and all food prepared on shore, except such make and quality of bread as is furnished by the paymaster, is prohibited.

He also directed that no fresh milk should be used on any ship of the squadron unless it had been previously boiled. On this ship it was boiled under inspection in the provision boat alongside, or under the care of caterers of officers' messes, although canned milk has been mostly used, and in time of epidemics on this station its sole use would be advisable.

For the winter months in any port of Japan cooking of all vegetables is still practiced, and shellfish are used with great caution as to the source of supply, and only when cooked.

Several cases of fish poisoning occurred in November, apparently from keeping fish on board overnight before cooking, supposed to be fresh the previous evening, and of the same kind (a species of horse mackerel) which had been found wholesome before.

The chief symptoms were intense dusky-red erythema diffused over face, neck, and to a less degree over arms and chest, with itching, œdema of face and eyelids, conjunctiva intensely injected, weak, rapid pulse, headache and vertigo, colicky abdominal pain of much intensity, nausea but not emesis, slight diarrhœa.

With prompt use of cathartics the symptoms vanished in one or two hours, except in one case there was much prostration for many hours.

Several cases of cholera having appeared in Yokohama in June, where the ship spent the summer, bathing in the harbor was allowed only on the last quarter of the flood tide.

Cholera not becoming epidemic and there being only several cases at that port during the season, the usual liberty for enlisted men was not stopped, but officers of divisions carefully instructed the men when on shore—

1. Not to drink water from any source except the Yokohama aqueduct unless thoroughly boiled, and that well water should be especially avoided.
2. Not to eat shellfish.
3. Not to eat vegetables or other food unless thoroughly cooked.
4. Also to report to a medical officer immediately in case of diarrhœa.

Ice used was made on board, except a small amount from shore made artificially from good water.

As showing the temperature of the living quarters for enlisted men on the berth deck in the hottest part of summer, and also just before use of steam heat in cold weather, the following thermometric table is given:

Compartment.	1896.	6 a. m.	2 p. m.	9 p. m.	Compartment.	1896.	6 a. m.	2 p. m.	9 p. m.
		°F.	°F.	°F.			°F.	°F.	°F.
Forward	August 10	82	86	87	Forward	August 15	86	85	86
Middle	do	83	85	86	Middle	do	83	83	86
After	do	88	92	93	After	do	88	87	91
Forward	August 11	83	85	89	Forward	August 16	85	86	86
Middle	do	82	84	87	Middle	do	82	84	85
After	do	87	87	91	After	do	88	92	92
Forward	August 12	84	88	89	Forward	August 17	83	84	86
Middle	do	82	87	88	Middle	do	82	82	85
After	do	88	91	92	After	do	89	90	93
Forward	August 13	84	87	89	Forward	August 18	83	84	86
Middle	do	82	86	88	Middle	do	82	84	85
After	do	88	92	93	After	do	88	88	86
Forward	August 14	84	88	87	Forward	August 19	85	88	88
Middle	do	83	87	87	Middle	do	84	88	88
After	do	88	92	92	After	do	88	91	92

The quarters on the gun deck are cooler. Many sleep on the upper deck under the awnings in hot weather.

The following table shows the usual temperature over the greater part of the dynamo room in hot and cool weather, it being somewhat cooler near ventilating blowers:

1896.	Maximum.	Minimum.	Mean of hourly observations.	1896.	Maximum.	Minimum.	Mean of hourly observations.
	°F.	°F.	°F.		°F.	°F.	°F.
August 1	118	110	113	October 1	109	103	106.5
2	117	107	112	2	109	103	106.3
3	117	111	113	3	113	103	106.8
4	118	109	114	4	107	102	103.7
5	117	112	114	5	108	98	103.5
6	117	110	113.6	6	106	98	103
7	119	115	116.5	7	108	98	102.5
8	120	113	116.5	8	108	100	104.5
9	118	110	113.5	9	106	98	102.2
10	118	110	114.5	10	106	96	100.2
11	119	108	113.5	11	106	92	100.2
12	116	110	112.6	12	107	95	102
13	121	112	115.5	13	110	104	107.7
14	117	110	114.5	14	108	100	102.3
15	118	107	114.5	15	105	99	101.2

The following table gives number of cases and deaths from the six chief infectious diseases in some of the principal localities of Japan proper during the year 1895, as taken from sanitary data furnished to the commander in chief by Dr. Stuart Eldridge, member of the central board of health of Japan:

Localities.		Cholera.	Typhoid.	Dysentery.	Diphtheria.	Typhus.	Variola.	Total.
Tokyo	Cases	3,424	1,585	152	806	11	36	6,014
	Deaths	2,625	415	50	233	6	3	3,332
Kyoto	Cases	1,843	932	908	234	9	19	3,945
	Deaths	1,553	275	274	101	4	9	2,216
Osaka	Cases	6,639	817	1,423	246	0	20	9,145
	Deaths	4,530	233	352	108	0	4	5,227
Kanagawa Ken	Cases	842	865	247	143	1	9	2,107
	Deaths	594	160	48	85	2	0	889
Hiogo	Cases	3,608	1,389	1,889	289	56	8	7,239
	Deaths	2,789	352	597	143	13	2	3,896
Nagasaki	Cases	1,749	460	539	33	0	86	2,867
	Deaths	1,213	67	168	16	0	20	1,484
Hiroshima	Cases	4,031	951	2,278	27	1	1	7,289
	Deaths	3,221	188	744	16	1	1	4,171
Kayoshima	Cases	551	62	4,421	15	0	71	5,120
	Deaths	357	11	826	8	0	22	1,224
Kamamoto	Cases	693	635	3,882	39	0	19	5,268
	Deaths	456	163	684	25	0	3	1,331
Total	Cases	53,999	36,678	50,977	6,100	184	1,287	149,225
	Deaths	38,500	8,331	12,418	3,036	49	268	62,602

The following notes relating to infectious diseases in Japan for the year 1896 are from the same source:

There were a few cases of cholera in June, and from June 24 to July 31 there had been reported throughout the country 127 cases, with 20 deaths. From this time to September 30 there had been, further, 46 cases and 9 deaths, cholera having nearly disappeared at the latter date.

At the appearance of warm weather a severe epidemic of dysentery afflicted the country and became widespread, the southern provinces particularly suffering.

The same internal quarantine, practically, as had been adopted for cholera was put in force, with good results reported.

From July 21 to October 9 there have been 44,747 cases and 9,729 deaths, the epidemic continuing later.

Smallpox has been unusually prevalent and widely distributed. It had been declared epidemic at Kobe in November, where during that month there had been several hundred cases, with a large mortality.

Relapsing fever has also affected a wide territory, and the cases have been very numerous.

Reports of the aggregate number of cases of infectious diseases for the year are not yet at hand.

The following notes relate to some of the hospitals visited:

The United States naval hospital at Yokohama has been inspected and found in excellent condition with the improvements lately made in its equipment.

Its very salubrious location at the highest part of the bluff, with full exposure to the winds of the hot season, was wisely selected, and has become highly valuable, all land in that desirable neighborhood being already appropriated. A fine and attractive appearance is given by its well-kept buildings and beautiful grounds.

The British naval hospital across the street has an equally good location and the advantage of larger grounds, which are some 6 acres in extent, and picturesque. Its wards are in several one-story buildings, and officers are treated in a separate structure. It has 100 beds and presents an excellent appearance.

The general hospital of Chefoo is under the management of the Sisters of the Franciscan Mission at that place. The medical and surgical service is performed by a local practitioner. The main part, two stories high, is well built of brick, and has 8 wards neatly and comfortably furnished, each containing from 1 to 3 beds. In a one-story building are five wards, chiefly for Chinese. Cases of infectious diseases are admitted. Patients receive very good care.

Shanghai general hospital medical and surgical service is very good. Sisters of St. Vincent de Paul, eleven in number, form the very efficient corps of nurses, aided by Chinese employees. The lady superior has immediate charge of the hospital, but it is controlled by a board of governors.

The rapid growth of Shanghai makes the need much felt for larger hospital facilities, and estimates have been made for a costly and elaborate structure combining all modern improvements. There are at present 100 beds, including 18 in the annex for infectious diseases, where cases of cholera and variola are received. A ward of 12 beds, comfortable, and of inviting appearance, is especially devoted to enlisted men from ships of war. A new part of brick has very good and well-furnished rooms with single beds. Both male and female patients are received, and the institution is an excellent one. Number of cases treated in 1896, 837, with 68 deaths, or a mortality of 8.12 per cent.

The following table, based on the hospital reports, gives an idea of the most notable diseases, and those peculiar to the climate, treated in 1895 and 1896:

Disease.	Number of cases.		Total deaths for the two years.	Continued to 1897.
	1895.	1896.		
Smallpox	27	38	22	3
Enteric fever	51	55	7	7
Malarial fever	49	28	0	0
Cholera	28	21	23	0
Dysentery	37	15	5	1
Acute diarrhœa	15	17	1	2
Chronic diarrhœa	37	37	0	0
Hepatitis	9	11	0	0
Abscess of liver	6	1	5	0
Bronchitis	29	24	1	3
Pneumonia	13	7	3	0
Syphilis	30	21	1	1
Alcoholism	51	63	2	2

The foreign settlement of Shanghai is supplied with filtered water from the Shanghai waterworks, which has a large filtering plant a mile below the city, covering some 15 acres of ground, to which a visit was also made.

Water is run from the river through a 30-inch main into three settling tanks, which have an aggregate capacity of 10,000,000 gallons, where it remains one or two days to settle. Thence it is pumped to a higher reservoir, from which it runs to extensive and thick filter beds on a lower plane, composed of sand with an under stratum said to be gravel and broken stone. From the filter beds it flows to an underground cistern covered over with brick arches, and is thence forced by powerful steam pumps through a 20-inch main to the city. A parallel main of the same diameter was laid in 1896.

The supply of sand is obtained near Ningpo, and, as it becomes overcharged with sediment in the filtering beds, it is removed at the surface several times until the remaining layer is too thin for use, when the usual depth is restored by clean sand. The same sand is used repeatedly after being washed by stirring in small iron tubs with clean water running in at the bottom and out over the top; some 30 tons being in this way cleaned in one day.

The process furnishes clear water very free from sediment. All areas holding water have substantial walls of masonry or concrete and concrete bottoms. The establishment has fine buildings of brick, and nearly $1,000,000 has thus far been expended on it. It is proposed to construct other works to increase the water supply for the French part of the settlement.

The Imperial Russian Naval Hospital at Vladivostock, designed for 200 patients, was completed and occupied in 1896, but had not been furnished at the time of our visit. Since then an artesian well has been finished, which is reported to supply 12,000 gallons of water daily.

The buildings are two stories high, exclusive of a basement, are handsomely and solidly built of brick, made in the neighborhood, and plastered and painted outside.

The location is on the west side of the harbor, to which the grounds extend. The long main building has three connecting wings on the east side and a corridor its whole length, into which nearly all parts of the structure open.

Wards are lofty and well lighted by large windows and in the wings occupy their whole width. All floors are of masonry, supported by iron girders, and have a surface of cement. The interior contains little woodwork besides, doors, stairways being of iron and stone. It is lighted by electricity, heated by steam, and ventilated by a blower run by steam in the basement, the air conduits in the large wards being of iron and running their whole length near the ceiling. The plumbing embraces the latest sanitary features.

An operating room is built out from the west side, and within the grounds is a fine mortuary chapel with facilities for necropsies adjoining.

The scheme of construction included future additions to meet the wants of this rapidly growing naval station, now the third in importance in the Russian Empire. There is provision for a fine house for the surgeon, not built at the time of our visit. The hospital is a very good one and well adapted to the climate.

Vladivostock has also a military hospital for its large garrison.

The Russian naval hospital at Nagasaki is situated at a considerable elevation above the harbor in the foreign settlement. Buildings are substantial, commodious, and kept in very neat order throughout. The main part has 6 wards with 45 beds for enlisted men, but there is room for more patients. Officers are treated in a separate building having four rooms each, with two or three beds, and bathroom and other conveniences.

It has a good operating room in a brick annex. The surgeon resides in separate quarters and is detailed for this duty from one of the ships of the squadron to which he remains attached.

Some of the large wards are ventilated by a small fireplace for coal set in the wall midway between floor and ceiling, and are heated by a brick furnace in one corner which is fed from the corridor outside.

This hospital is closed in the hot months of summer and reopened in the autumn, when several ships of the squadron again visit the port.

About May, by the very liberal provision of the Russian Government, patients affected with rheumatic, pulmonary, and syphilitic diseases are taken to the sulphur springs of Unzen, distant some 30 miles east of Nagasaki, at an elevation of 2,500 feet on the mountainous peninsula of Shimabara. This place is noted as a sanitarium, and is a summer resort for residents of southern Japan and Chinese ports. It has good hotels, fine baths, bracing air, and picturesque and beautiful scenery, several mountain peaks rising above it.

Obama, at the foot of the mountain, has hot alkaline springs and good hotels and is also an attractive summer resort for foreigners. Many residents of Vladivostock spend the cold months of the year in southern Japan.

At the appearance of hot weather, patients from the naval hospital leave Unzen and are taken to Vladivostock, which has a salubrious climate for invalids at that season.

By the courtesy of the Japanese authorities, facilities were given for inspecting the very fine Nagahama quarantine station recently completed on the west shore of the bay about 8 miles below Yokohama. The buildings are of wood and well constructed. The hospital building proper, with its quarters for physicians and attendants, is located in a separate inclosure, on the extreme left as seen from the bay, and ground beneath this building is covered with a thick layer of cement, above which the floor is placed several feet, the intervening space being well ventilated. This has one story, divided into small wards by partitions of no great height, there being no ceilings, and the space above entirely unobstructed to the rafters. Water-closets have earthen jars to receive excreta, as is the common practice in Japan.

There is one wharf and a small harbor for launches and tugs formed by a stone breakwater. It is proposed to build a separate wharf connecting with the hospital.

The rest of the establishment consists of a two-story building with office and quarters for superintendent and others, the station being under the control of the inspector in chief of police at Yokohama; a fine structure of one story, containing a number of sleeping rooms and a dining and sitting room, all plainly but elegantly furnished and designed for use of first-class passengers temporarily detained at the station; a disinfecting plant of the latest pattern, and bathing quarters, designated first and second class, supplied with hot and cold water, with separate quarters for men and women, which are sufficiently large for the use of a great number of people at the same time, the arrangements being as follows:

First class—reception in a waiting room, adjoining which are bathrooms, each with a closet for undressing, whence clothes are taken to the disinfector, with a numbered tag of metal attached, the duplicate of which is given to the owner. After the bath, putting on a bath robe in a closet beyond, thence going to a dressing room, where clothes are returned.

The arrangements of the second class are the same, with relatively fewer bathrooms; but firemen and others wash together in several large spaces provided with water tanks, hose attachment, and buckets.

There is steam engine, electric-light plant, and a light tramway extends from the wharf to all parts of the station. An aqueduct furnishes good water. The dead are disposed of in a brick crematorium situated a short distance from the hospital. The station is very complete in all of its arrangements.

The following information relating to Shanghai has been taken from the very elaborate reports of the health officer of that place:

Deaths registered in 1896 in the whole foreign community, resident and nonresident, including the French Concession and foreign shipping, 135; death rate, 22 per 1,000, population being 6,123.

Deaths of adult residents, 59—from tuberculosis 9, enteric fever 5, smallpox 3, cholera 3, dysentery 2, as showing the most notable diseases.

Deaths of infants and children, 29—from smallpox 5, meningitis 4, typhoid fever 3, diphtheria 1, tuberculosis 2, no deaths from other infectious diseases appearing.

Death rate, 1885, 20.6; 1886, 24; 1887, 26.4; 1888, 21.6; 1889, 18.4; 1890, 23.9; 1891, 25; 1892, 19.3; 1893, 18.4; 1894, 23.5; 1895, 23.5.

After an immunity of three years Asiatic cholera again appeared in the settlement, July 22, 1895. Some 20 deaths had been reported in Old Shanghai from the 15th to the 23d of that month. The outbreak was coincident with the appearance of unusually warm weather and the decline of the epidemic, which was abrupt, corresponded to a fall of temperature in the second week of August.

From 26 cases received into the general hospital there were 14 deaths. During the year there were 20 deaths in the foreign population, 11 being of residents.

The native returns show 928 deaths in the settlement north of the Yang-king-pang having a population of 250,000.

From Old Shanghai, with an estimated population of 100,000, from the French concession with 52,000, and from the suburbs surrounding the native city and settlements with probably 50,000 more, some 200,000 Chinese in all, there are no native returns whatever, either of diseases or causes of deaths.

Cholera recurred in 1896 with 10 deaths during the year in the foreign population. Of 21 cases in the general hospital 9 proved fatal, a mortality of 42.8 per cent. The shipping furnished 15 of these 21 cases.

As far as could be gathered from the native returns, only 18 deaths were due to cholera among the Chinese in the whole year.

Cholera appeared every year in Shanghai from 1875 to 1891, inclusive, which fact makes it seem very probable that it is endemic.

As to its absence in the three following years the health officer states:

> I have no knowledge of any case of cholera occurring either in the foreign or native community during these years, but with such scanty information as I possess regarding the health of the Chinese, outside our own settlement, I am not warranted in saying positively that immunity was complete.

He further remarks that its reappearance after the lapse of time, as in 1895, might with reason be ascribed to an imported contagium.

Deaths registered from cholera in the foreign community during twenty-four years.

Year.	Number of deaths.	Year.	Number of deaths.	Year.	Number of deaths.
1873	0	1881	13	1889	1
1874	0	1882	15	1890	32
1875	9	1883	23	1891	23
1876	1	1884	2	1892	0
1877	16	1885	25	1893	0
1878	16	1886	23	1894	0
1879	2	1887	18	1895	20
1880	2	1888	5	1896	10

Deaths from smallpox in the settlements north of the Yang-king-pang, 1888–1896.

	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
Foreign	2	1	4	3	5	11	9	7	19
Native	54	29	79	223	78	184	125	138	316
Total	56	30	83	226	83	195	134	145	335

A station for the cultivation of calf vaccine in Shanghai was opened in October, 1896.

Vaccination has lately made much progress among the Chinese at Shanghai and they now see its value as a substitute for inoculation still generally practiced. Besides the biweekly vaccination by native doctors in the native hospitals of the settlements some 7,000 vaccinations were made in 1896 at the vaccine dispensary maintained by the taotai in the Old City and the practice has extended to the neighboring villages.

APPENDIX.

Summary of cases of bubonic plague at Hongkong from the outbreak in 1894 to January 1, 1897:

FOR THE YEAR 1894.

Total number of cases not accurately determined.

Deaths registered for the year, 2,552.

The Chinese figures are difficult to work out owing to so many removals having taken place. (Report of Dr. Lowson.)

The following table gives the numbers where definite results as to recovery or death were known, but does not include dead bodies found in town and sent straight to the burial ground:

Nationality.	Affected.	Died.	Mortality per cent.
Europeans	11	2	18.2
Japanese	10	6	60
Manilamen	1	1	100
Eurasians	3	3	100
Indians	13	10	77
Portuguese	18	12	66
Malays	3	3	100
West Indians	1	1	100
Chinese	2,619	2,447	93.4

There was reliable information as to age in 2,050 cases, shown as follows:

Age.	Males.	Females.
Under 5 years	18	27
Between 5 and 10 years	65	73
Between 10 and 20 years	281	190
Between 20 and 30 years	244	84
Between 30 and 40 years	323	75
Between 40 and 50 years	233	74
Between 50 and 60 years	127	86
Between 60 and 70 years	56	49
Over 70 years	21	24

Of the 1,627 persons admitted to the Slaughter House Hospital alive, 1,037 were males and 590 females. Of the 828 bodies brought in dead, 472 were males and 536 females. Considering the comparative smallness of the Chinese female population, it will be seen that they suffered severely. By last census the proportion of females to males was only 23 to 57. This heavier female mortality was only to be expected when it is remembered that women and children were practically confined to the houses in the infected areas every hour of the twenty-four, while the men were generally absent during the day and in many cases slept in the streets at night, a thing which the women, as a rule, are not accustomed to do. (Report of Dr. Lowson.)

FOR THE YEAR 1895.

Total number of cases, 44; total number of deaths, 43.

Except 3 Portuguese, all were Chinese.

Some of those affected had just arrived from Canton while sick, or were found dead on steamers in the harbor. (Report of colonial surgeon.)

Total number of deaths registered of persons properly belonging to the colony in the year 1895, 36.

The distribution of cases was as follows: April, 3; May, 2; June, 13; July, 2; August, 4; September, 3; November, 6; December, 12. (Report of medical officer of health.)

FOR THE YEAR 1896.

Total number of cases, 1,204; total number of deaths registered, 1,078.

In January, 1896, there were some 30 cases. Deaths registered for the remainder of the year as follows: February, 111; March, 174; April, 273; May, 292; June, 130; July, 43; August, 12; September, 7; October, 3; November, 0; December, 1.

MORTALITY FOR THE YEAR 1896.

The mortality of the disease among patients in hospital was 73 per cent.

Among Europeans in the Kennedy town hospital and in the Government civil hospital the mortality was 50 per cent. In the latter, of 9 Europeans treated, 4 died.

The mortality among Asiatics was 90 per cent, but this estimate does not take into account that a large number of those attacked fled to Canton or were transported there with the permission of the Government. (Report of Dr. Wilm.)

The following table shows the number of deaths from all causes and the death rate per 1,000 of Hongkong during the past six years, as taken from the report of the registrar-general:

	1891.	1892.	1893	1894.	1895.	1896.
Estimated population:						
British and foreign	10,494	10,590	10,686	10,782	10,828	12,709
Chinese	214,320	221,072	228,038	235,224	237,670	226.710
Total	224,814	231,662	238,724	246,006	248,498	239,419
Deaths	5,374	4,906	5,422	7,407	5,400	5,860
Death rate per 1,000:						
British and foreign	18.20	17.37	17.97	23.28	17.64	19.91
Chinese	24.18	21.30	22.93	30.42	21 92	24.75
Total	23.90	21 18	22.71	30.11	21.73	24.48

Herewith I forward to the Bureau of Medicine and Surgery one copy each of the following reports[1] relating to sanitary matters, issued by the colonial government of Hongkong for the years 1894, 1895, and 1896:

1. The Epidemic of Bubonic Plague in 1894, by James A. Lowson, M. B.
2. A Report on the Epidemic of Bubonic Plague at Hongkong in the Year 1896, by Staff Surgeon Wilm, of the Imperial German Navy.
3. The Colonial Surgeon's Report for 1894.
4. The Colonial Surgeon's Report for 1895.
5. The Sanitary Superintendent's Report for 1894.
6. The Sanitary Superintendent's Report for 1895.
7. Report of Medical Officer of Health for 1895.
8. Report Showing Progress of Special Work Carried Out for the Prevention of the Further Spread of Bubonic Plague, dated October 21, 1895.

Also are inclosed:

9. Quarantine Regulations of Hongkong Put in Force May 1, 1897.
10. By-Laws of Sanitary Board of Hongkong Approved by the Legislative Council May 17, 1897.

Complete sanitary reports for Hongkong for year 1896 had not been published up to a very recent date.

REPORT ON THE U. S. FLAGSHIP NEW YORK.

By MICHAEL C. DRENNAN, *Medical Inspector, United States Navy.*

The general health of those on board has been good. There has been no epidemic disease except catarrhus epidemicus, of which only one case was severe enough to require hospital treatment.

At the beginning of the year the *New York* was at anchor in Hampton Roads, Virginia, where the ship remained until February 9 and then went to Tompkinsville for the purpose of giving general liberty to the crew. After a week's stay at the latter place the ship went to Newport News, where coal was taken. Then Hampton Roads was visited. There was considerable sickness, and the sick days for the first quarter ran up to 1,067. There were 14 cases of catarrhus epidemicus, 13 of which were discharged to duty and 1 transferred to naval hospital, Norfolk, and 22 cases of bronchial catarrh, all of which were discharged to duty.

In January, 1 case of febris pneumonica was admitted. The patient was an unusually robust negro, 22 years old, and less than a month enlisted. The attack began with a chill, followed by high temperature and a rapid rise in the number of respirations. The physical signs did not show a large area of lung tissue involved. The sputum was characteristic, but not copious. Stimulants internally, with strychnia hypodermatically were freely used. On the fifth day of his illness he had a severe attack of dysnœa attended with great prostration, and for a time it seemed that death would be immediate. Inhalations of amyl nitrite were given freely, and in a short time the breathing became easier, the pulse stronger, and the patient expressed himself as feeling better. The inhalations were continued from time to time, but death occurred on the seventh day. I am convinced that the inhalations of amyl nitrite in this case prolonged life for two days. The supply of pearls furnished to the ship was insufficient and more were obtained from ships in the squadron. No autopsy was held.

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[1] Placed in the library of the Naval Museum of Hygiene.

In April a second case of febris pneumonica was admitted to the sick list and transferred to the naval hospital at Norfolk, where the patient died a week later. Two cases of acute pleurisy occurred during the second quarter. Both had effusion, but little cough, no expectoration, and a high temperature. Both cases were transferred to the naval hospital, New York, where the high temperature continued for a long time. They were ultimately discharged to duty. One case of erysipelas and 1 of rubella were admitted and at once sent to hospital. One case of typhoid fever was sent to the New York Naval Hospital while the ship was in Fishers Island Sound. The infection probably occurred while the man was on liberty. Later a patient transferred to hospital on the third day of his illness with diagnoses of remittent fever developed typhoid. During the summer and autumn there was much discussion in local papers about the bad condition of the Brooklyn City water supply. The ship was at the yard for several weeks afterwards, and though the water was in daily use by those on board no bad effects were noticed among the crew. A few cases of simple diarrhœa occurred.

Only 2 men were severely injured during the year. A seaman had his shoulder dislocated and badly contused by a fall resulting from some mishap to the falls of a boat while it was being hoisted at the davits. The luxation was reduced under ether. The carpenter received a comminuted fracture of both bones of the leg, from the anchor chain striking him as the anchor was let go. Both cases were sent to the hospital.

During the past year there has been a great deal of dentistry done on board of this ship. At Hampton Roads a dentist spent several afternoons giving attention to the teeth of young and old.

Form "X" for the year just ending contains the names of 293 persons examined on board for enlistment. Of this number 180 were rejected, 7 of them for color-blindness. Many of them were examined under very unsatisfactory conditions, and when the recruiting was most active there were calkers, joiners, steam fitters, and other workmen in large numbers at work on board. The din was so great that I asked that some place on shore be secured in which examinations could be made. None was provided. The medical officers making the examinations deserve much credit for the ability displayed in their selection of recruits under such unfavorable surroundings.

Two cases of heat prostration occurred during the very hot weather of the past summer; one a fireman, while at work in the fire room, the other an officer. Neither was serious, though the latter was a long time regaining his normal strength.

The ship has not been farther south than Cape Henry, and Fishers Island Sound was the northern limit of cruising. The men were drilled on the island for a week. No mishaps occurred among them during that time.

A steam heater was put in the additional sick quarters on the gun deck while the ship was at the navy-yard last summer. The compartment is now available for use at all times. The steam radiators in the sick bay were taken out and steam coils secured to the ship's side were substituted. There is now no difficulty in heating the bay in very cold weather. The removal of a torpedo rack from one side of the compartment would give more space for the sick. The refrigerator in one of the sick-bay compartments was of so little use that it was taken out and a locker to hold surgical dressings and bandages is to occupy the space vacated. The bottle clasps in the dispensary have been removed and racks substituted which are more neat in appearance. The work was done by the carpenter's force of the ship.

The ventilation and water supply have not been changed. The general ventilation is good. Compartment B 148, in which the warrant officers' quarters, the pay office, and junior officers' pantry are situated, is badly ventilated. A sufficient supply of fresh air by natural methods can not be had in this space. A double set of blowers, one for exhaust, the other for supply, is doubtless the only method of properly ventilating this compartment.

REPORT ON THE U. S. FLAGSHIP PHILADELPHIA.

By J. A. Hawke, *Medical Inspector, United States Navy.*

On January 11 the ship left San Francisco and cruised to the southward, visiting Santa Barbara, San Pedro, Santa Monica, and San Diego Cal. Near the last city, on North Island, the battalion, consisting of five companies, went into camp for three days, being joined by one company from the United States Army, furnishing their own A tents. The ship's awnings made an immense and ample tent for our entire battalion. The ambulance corps was daily drilled in emergency work and quick transportation of wounded to field hospital. The officers and men slept on dried seaweed on the ground. The health of the battalion while in camp was good.

The flagship returned to San Francisco May 5, going thence to Mare Island for docking, and leaving for Santa Cruz and Monterey June 15. She again returned to San Francisco in July, coaled, and cruised to the northward, visiting Astoria, Portland, Oreg., and Port Angeles, Wash., remaining at the latter port for two months. During this time, this and other ships of the fleet were occupied with fleet drills and target practice. Again the battalion went into camp for one week, this time augmented by men from the *Monadnock* and *Monterey*, seven companies in all. The camp site was in a valley in the pine woods by a fine creek. Officers and men slept under canvas from the ships, on fir boughs, ferns, and moss. No illness occurred. Again the hospital corps and stretcher men were daily drilled in field and "Red Cross" work.

The ship, after fleet review, left Puget Sound in October, stopping three days at Victoria, British Columbia, the various hospitals and barracks being visited. There are two civil hospitals—the Royal Jubilee (55 beds), nonsectarian, and the St. Joseph's (50 beds), Roman Catholic. Both afford ample accommodations for medical and facilities for surgical cases, with modern operating rooms. Prices, $10 for ward and $15 and up for room cases per week. The naval hospital at Esquimalt, British Columbia, is admirable.

The ship returned to San Francisco October 16, and Mare Island Navy-Yard for docking and slight repairs, and after coaling in San Francisco on November 28, proceeded to Callao, Peru, arriving December 13. The health of Callao and Lima being reported good, barring the usual smallpox, the men were given day and night liberty, recruits being carefully protected by vaccination. On December 27, with a clean bill of health, we left Callao en route to Valparaiso, Chile, the close of the year finding the ship at sea.

During the year the sanitary condition of the ship and health of officers and men have been good. No deaths have occurred and few cases of serious illness. There have been no epidemics. The ship is well ventilated, a fine sea boat, and fairly warmed in cold weather. Distilled water alone has been used for drinking.

The total number of sick days for the year was 975; the percentage of sick, 0.181+; the number of days in port, 332, and the number of days at sea, 34.

REPORT ON THE U. S. S. INDIANA.

By George P. Bradley, *Surgeon, United States Navy.*

The type of first-class battleships represented by the *Indiana* is comparatively recent in our service, and this is the only one of her class which has been in commission long enough to allow examination under varying circumstances of place and season. The vessel has not been in a tropical climate, but in the first half of August last, during unprecedented heat of weather, she was at sea under full steam and practically under conditions approximating those of actual service in warm latitudes.

Inasmuch as the last sanitary report from this ship was made without opportunity for much experience, it has seemed proper to begin with a consideration of the various compartments and divisions, so far as they relate to the medical department, discusssing under this head the important question of transportation of wounded in time of action, and then the objects of common interest in every ship of war, such as ventilation, light, heat, etc.

Without describing details of construction, I shall refer to those portions immediately connected with sanitation, and only in a few instances give a somewhat more minute description, including the cubic-air space, which, even in the living compartments, has ceased to be of the importance attached to it before the use of artificial ventilation.

Looking first at the ship as a whole, it is evident that the prevailing idea in her architecture was that of a fighting machine, where all other requirements were to be sacrificed, so far as necessary, to the installation of a very heavy battery, with its requisite provision of ammunition and appurtenances. So far has this idea been carried that the usual living quarters for even the limited number of officers contemplated and actually detailed for her could not be provided without encroaching on space designed for other purposes. The torpedo tube corresponding to that still remaining on the starboard side has been removed to afford a steerage messroom for the junior officers, who require also the two forward staterooms, each fitted with two bunks. The space for wardroom lavatory, which originally contained sufficient baths for wardroom officers, was encroached upon to furnish a room for a warrant officer. This room, owing to its inclosed situation, and especially to certain hot-water pipes passing into it, is quite untenable in hot weather or a hot climate, as was shown during the first part of August, when its average temperature was over 100° F., and its occupant was obliged to pass his nights on deck. It may also be said that this crowding occurs with a relatively small allowance of officers, especially of wardroom officers. Examination of the plan of this vessel will show a great, perhaps an unnecessary, amount of space below the berth deck devoted to store rooms, etc., which, with a more complete system of ventilation, might be utilized for quarters, as in the

Atlantic mail steamers. The most serious objection to this is the little height between decks of the orlop, necessitated by the situation of the armor belt, the chief protection of the hull, and the protective deck. The crew spaces are equally cramped, and on several occasions the inconveniences of crowding men into the lower parts of the ship (ammunition passages) have been manifest.

The captain's quarters occupy the after part of the vessel, on the level of the berth deck, comprising the usual apartments—cabin proper, staterooms, bathrooms, etc., with a cubic air space of over 6,000 feet. They would require no special notice but for the fact that, owing to their situation directly over the steam steering room, two decks below, they are excessively hot when the ship is under steam in hot weather. During last August (referred to because it affords an indication of the probable conditions in the Tropics) the linoleum covering the steel deck was unbearably hot to the feet. It is understood that an effort will be made to ventilate this lower compartment, which at present heats all the after part of the ship, by means of a direct communication with the outer air and by powerful electric blowers. It may here be stated that the linoleum referred to extends throughout the various compartments of the ship from the superstructure downward, being firmly united to the steel deck by a cement and kept shellaced. It serves its purpose admirably, and is indeed indispensable, securing dryness and equal temperature. It has required renewal in only one place, on the superstructure or main deck, where, during a gale, salt water got under portions of it. The quality of the cement used is very important, as I believe cases have been reported where a poor article caused much trouble. In a vessel of this character, where woodwork has been dispensed with to an extraordinary degree, this deck covering is of the utmost hygienic value.

The cabin pantry and an office for captain's clerk occupy the two after rooms on either side forward of the cabin bulkhead. The former is supplied with a pipe for hot water, which, running a considerable distance through the wardroom quarters, is an inconvenience in hot weather.

A supernumerary cabin has been added during the past year on the bridge aft for the convenience of the captain at sea or in very hot weather.

The wardroom quarters are situated entirely without the "citadel," or protected part of the ship, and are divided by the large after turret in their forward portion. The wardroom "country" or mess room has its inboard side wholly formed by the turret, and is therefore of somewhat irregular shape, and, containing about 3,300 cubic feet, is small for the size of the vessel. It is a thoroughfare from forward aft, there being no communication on the decks below. The staterooms are both inside and outside, in number 14, varying in size, but with an average of 528 cubic feet each. The bulkheads and sliding doors are of steel, covered with cork paint. These rooms communicate with the outside air by air ports or skylights. The first named consist of square steel ports of 24 inches each, with a circular glass deadlight of 12 inches in its center. The square ports can be raised, but both are necessarily closed at sea, the ship being low in the water. The skylights are about as useless under the same circumstances, and have, besides, given some trouble from leakage. Each room contains a tube, with valve for artificial ventilation, opening near the ceiling. It may be remarked here, as applicable to other parts of the berth deck also, that the cork paint does not prevent the condensation of moisture on the sides of the ship during cold weather, and in fact these sides are sheathed with deal in the officers' quarters. Yet even there in the winter a sensation as of a constant currrent of cold air is felt by one lying in his bunk, coming from the square air port; while in the berth-deck crew space, as also in the sick bay during our first winter in commission, there was such dripping as to require constant use of swabs. At my request the sick bay has now been sheathed, and it is certainly very desirable that the berth deck should be also. Such sheathing, if made in sections, could be easily removed in case of active service, when these unarmored parts of the ship are considered liable to be set on fire by shells, or wood might be used that has been rendered incombustible.

These rooms are sufficiently lighted by movable electric lamps (Edison system, 16 candlepower), and have lately been warmed by a separate steam coil for each, in addition to the coils in the passages. In the northern winter this amount of heat is not superfluous, especially in the outside rooms, where the cold strikes through the limited space of steel uncovered by sheathing, particularly on the windward side.

The quarters for junior officers are, as has already been stated, each fitted for two occupants. By the living space just forward of these, and by a mess room or "country" inside the citadel, derived from the port torpedo room, these living spaces accommodate about 12 officers, better, indeed, than the old-time steerages, but not so well as those in modern cruisers of less size. The average cubic air space of the two rooms is given as 916 cubic feet, that of the quarters as 4,911; but it should be remarked that various fittings, more or less temporary, exist and reduce the space. The mess room inside the citadel is a part of the general berth deck, and merely consists of a small portion curtained off, about the size of the preceding, fitted with table, chairs, etc. The armor doors leading to the citadel here and at the corresponding points on the other side and forward deserve mention, for a singular accident to a young officer has already occurred by means of one. In a heavy sea, when the ship was rolling violently for the only time in our experience of her, this extremely heavy door, weighing probably 1½ tons, in some manner slipped its fastening clamp, which held it open, and in slamming to and fro crushed this officer's leg, necessitating amputation.

It may be mentioned here that the almost total absence of wood in the general construction of the ship, sharp angles of steel everywhere abounding, has led to a decided increase of minor accidents also, requiring surgical treatment, from trivial falls or blows which were without consequence on the old vessels.

The pantries for wardroom and junior officers occupy small compartments just within the armor space, and would require no special notice were it not for their connection with a rather remarkable system of tank drainage which may as well be referred to here, as these and other pantries are responsible for a good share of the nuisance occasionally caused by it. On the orlop deck are two small compartments, occupying a corner of coal bunkers, one on the port and the other on the starboard side. These are the tanks which receive the drainage from the firemen's washrooms on the berth deck just above from the wardroom lavatory and pantry, and on the port side from the steerage and warrant officers' lavatories and pantries. These tanks are pumped out frequently by special steam pumps, and their contents, returning to the level on the berth deck, join with the products of the water-closets (on the starboard side) to be discharged outboard above the armor belt.

These tanks are small, and the great length of tubing, with very little fall and frequent change of direction, from the pantries, tends to deposition of grease, etc., along its sides. There is frequent overflow from back pressure into the lavatories, and even past the valves into the water-closet bowls, while cleansing of the tanks and pipes is rendered difficult from their constant use.

On many occasions during the hot weather the pumping of the drain tanks has been attended with the characteristic odor of sour sink slops, and when the tanks were cleaned a thick deposit of most offensive material was found. The difficulty arising from the slight fall could be partially remedied by placing the tanks on their sides, instead of ends, as they are at present; but it is to be wished that this complicated system could be dispensed with and a direct outflow be provided for at least the pantries, since the floor of the berth deck is 16 inches above the water line at ordinary draft.

The wardroom lavatory now consists of practically only one bath tub, the larger of the two compartments remaining being fitted with two set basins, entirely useless to officers, who have these conveniences in their staterooms. There is ample space here for two or three shower baths, which would be of the greatest service and could be put in at little expense, the floor being already drained and tiled.

Proceeding forward on the berth deck, we have on the port side the quarters of the warrant officers, with the exception of the boatswain, whose room on the starboard side has already been referred to. These rooms, as well as the paymaster's office, tenanted by his clerk, are quite cut off from the side of the ship by coal bunkers, and so must depend on artifical light and ventilation. As will be hereafter stated, the latter is quite inadequate as at present installed and operated, while the great heat from the boilers and the various supernumerary engines renders them, especially in summer and while the ship is at sea, the most unhealthful of any apartments on board. The boatswain's room is the worst of them, but all are unfit for habitation under the above circumstances. It is not easy to suggest a remedy, the problem involving so many questions of construction in a purely military sense, yet it would seem that so much space as exists on a vessel of this size might be better utilized, and that such quarters might be shifted to another part of the ship.

A donkey boiler is situated opposite an open space just forward of the paymaster's office. This boiler, with a corresponding one aft, occupies space which would be useful for other purposes, and the removal of both has been recommended by the commanding officer, as also, I understand, by the board of inspection, as unserviceable and unnecessary. The open space alluded to above is occupied by the marines, who are overcrowded in one of the hottest parts of the ship.

On the starboard side of the berth deck are the water-closets for wardroom, junior, and warrant officers. These are fitted up on the Bishop system, and with constant attention are usually in good sanitary condition, though intensely hot under conditions above indicated. A rather complicated system of valves is necessary for emptying the pans, the outflow being only at the surface in smooth water at ordinary draft. The urinals, however, empty by gravitation.

The firemen's wash rooms have already been mentioned. Their floor is of a rather rough cement, and should be made smoother and harder; or better, they should be replaced by tiling. As usual in such places, only the most rigorous inspection can prevent an insanitary condition.

An ice machine on the starboard side and a cold-storage room in the corresponding position on the port have been of great service. The water in the scuttle butt is cooled by a coil proceeding from the latter and returning to the former.

Two cells for the confinement of prisoners are placed amidships, abutting on the after end of the forward turret. They are of about the usual size (900 cubic feet for the two) and provided with a ventilating pipe, the steel doors also being perforated.

In hot weather, with steam up, they are too hot and are frequently unfit for use.

Leaving the citadel, a large crew space forms the principal mess and berthing place on this deck. According to the report at time of inspection, this, with a capacity of 22,438 cubic feet, together with all available spaces inside the citadel, passageways, etc., where hammocks can be slung, bringing the total living space to 46,974 cubic feet, furnished billets for 172 men, affording only about 272 cubic feet per man. Yet under ordinary circumstances this compartment at least, being cut off from the boiler spaces and open to both sides of the ship, is more comfortable than most of the others for the men. Moreover, a certain number of them, especially petty officers, sleep in lower passages and places connected with their duties.

The chief defect in cold weather has already been alluded to, viz, the absence of sheathing on the sides of the ship. Certain of the men also are unavoidably exposed to cold drafts from hatches, etc., when in their hammocks, as in all ships. The substitution of steel wire for wood in the construction of all lockers for mess property, etc., is of great advantage, both for cleanliness and for saving room.

The remaining space forward on this deck is divided into the following compartments, of very unequal size: The sick bay, on the starboard side, with the dispensary, taken from the berth deck; a much larger space on the port side (the sick bay not nearly reaching amidships), at present used for a carpenter's shop and crew space, in which are certain small wash rooms for the men, but they are never used; forward of this, and on both sides of the bows of the ship, divided by a narrow gangway, the head, and in the very eyes a small compartment for a torpedo tube.

The sick bay is very small for the size of the vessel and number of men. This disadvantage is much increased by the fact that it is much more difficult than on the older style of ships to dispose of sick who need a hammock or cot on account of the absence of any large spaces, such as the berth deck or gun deck of old vessels, and of the use of tables and benches for messing, which makes it difficult to sling a hammock during the day. On various occasions there has been embarrassment from this cause. An empty (and hitherto unused) coal bunker on the berth-deck level has been found temporarily available; but these are usually not empty, and besides are unfit for permanent use. Not more than 3 persons, exclusive of the baymen, can be properly berthed in the sick bay, and it is frequently overcrowded, in spite of our usual vicinity to a hospital. Its cubic capacity is 2,110 feet. A small compartment forward, of 367 cubic feet, contains a bath and water-closet. Two air ports, a ventilating shaft in the deck above, which often can not be used, with a cot directly beneath, a pipe connected with the artificial ventilation system, and a powerful electric fan, recently attached, are the means of ventilation. It is sufficiently warmed by a steam coil, and lately, at my request, the following improvements have been made here and in the dispensary: A ventilator for the bathroom, a steam connection to heat the bath, sheathing of side of ship, as already reported, and a small steam coil in the dispensary, where last winter the temperature fell below freezing.

The dispensary (314 cubic feet, excluding lockers, etc.) calls for no special comment. It is provided with one 12-inch air port, water in stationary washstand, and the usual fixtures for bottles.

A small storeroom in the orlop passage answers the purpose of keeping reserve stores when furnished in usual amounts.

Early in the commission of the ship the ventilating holes in the longitudinal bulkhead of the sick bay, through which odors from the head penetrated by way of the carpenter's shop, were closed, and this also to a certain extent has made the noise from that compartment less objectionable. The minor defects mentioned in the last report have also been attended to; but, on the whole, the facilities for the proper care of the sick or wounded are very inadequate, particularly as regards space, and call for extension in the construction of future ships. The very situation of the sick bay, immediately abaft the head, is objectionable, depending on perfect tightness of a bulkhead for protection against the gravest dangers. It is unfortunate that the head should be situated on this level instead of a higher one, but it is difficult to fix on another place, and the same may be said of the sick bay. At all events, the space devoted to the sick should be largely increased, for it is not to be doubted that if thrown on her own resources for any length of time, the ship has no satisfactory means of dealing with any unusal number of invalids. If certain alterations, hereafter to be mentioned, were made, room for the sick bay might be found on the main deck, within the superstructure.

The chief crew space for berthing and messing on this "main deck," as it is now technically described, has a cubic air space, as officially given in the report of inspection, of 35,536 cubic feet, which, for 185 men, would allow only about 192 cubic feet for each, but, as already remarked, any inference drawn from this would be quite misleading.

This compartment, under ordinary conditions, is the most healthful of any in the ship. It is practically divided into two, on either side, by the inclosed spaces for donkey boilers, engine, and fire-room hatches, etc., which occupy so much space on this deck; but the galley, open from side to side, gives a good circulation of air, and the larger gun ports and hatches secure ventilation, while in winter it can be warmed by steam coils.

Occasionally, in very heavy gales, it is wet, but usually it is the best substitute for the gun deck of older vessels for the men during their idle moments, and it is to be regretted that the exigencies of construction did not allow a larger area. There is a great amount of room at either end of the superstructure rendered unavailable, or only partly available, especially on account of the four smaller turrets, about which is quite a labyrinth of little cells and passages, at present utilized as bag rooms, etc. I am of opinion that some of these might be made use of for the confinement of prisoners, especially in hot climate or in summer, when the cells below are often quite unfit for such a purpose.

The two decks above the main (upper and bridge decks) require little notice, as there are no regular sleeping billets on them; but I may mention that the commanding officer suggests the feasibility of inclosing the former by light constructions, which, at any rate in warm weather or in hot climates, would add very materially to the berthing space of the crew, and, especially, admit of the removal of hammocks from the lower and hotter parts of the ship, which are the most unhealthful under such circumstances. In fact, if it can be done, this will go far to solve the problem. The ammunition passages of the orlop deck are used for berthing, and at times have proved very objectionable, both from heat and poor ventilation.

The very numerous storerooms, which take up so much of the space of the orlop and lower decks of the ship in its after and forward portions, may be said to be generally well adapted to their uses, and in good sanitary condition. A few are overheated from the passage of steam pipes through them, but with proper adaptation of the stores kept in such, it is believed that no loss has occurred from this cause.

An important alteration has been made during the past year in the hold. This large space extends clear to the bottom of the ship, the double bottom being absent here. It is now divided into two by a water-tight floor, which gives greater safety, with much increased room for storage.

The bilges, formerly the opprobrium of sanitation, are here remarkably easy of access and easily kept clean with proper attention. Draining into cisterns, they are in almost all parts dry and sweet. Under some parts of the engine room many pipes pass through them and prevent such complete access, but even here careful attention keeps them clean.

Other hygienic points in regard to various portions of this vessel, or to the ship as a whole, may be touched upon under other heads hereafter. It remains at present to refer to the important matter of the care of wounded in battle. The sick quarters used in time of peace, as well as the greater part of the crew spaces, are entirely unavailable, being unprotected by any armor, while of the remaining space nearly all is devoted to strictly military uses. The extraordinarily subdivided construction of the ship below gives little spare room, while, to complete the difficulties, the only parts below the water on the orlop and platform decks at either end, which might be arranged for the reception and care of the wounded, are entirely cut off from the fighting parts, no communication through the bulkheads existing below.

Take, in addition, the necessary interruptions of the usual ways of communication between different portions of the ship, both above and below, as enjoined by regulation and custom, the crowding and turmoil and excitement of battle, even as seen in its mimicry of drill, and the hindrances to humane and satisfactory disposition of the injured are apparent.

The temporary sick bay assigned during action is that space described as the junior officers' mess room or steerage country, and this appears to be the best available. Its disadvantages are that it is not well protected, and is, of course, too small to allow the reception of many patients, while, for reasons already mentioned, the adjacent officers' quarters aft are unavailable for the disposition of patients operated on or dressed. In some other respects it is favorable, water being at hand in the bathroom, and plenty of artificial light, so long as the electric apparatus holds out, for, of course, with the ship cleared for action, battle ports and hatches on, etc., daylight is excluded. The various apartments within the citadel—warrant officers' room, bathrooms, pantries—any place where a narrow mattress could be laid down might provide for perhaps some twenty people. The most serious question is that of transportation of wounded from various fighting parts of the vessel to this central hospital. It is evident that the greater liability to casualties is among the men serving the 6-inch guns on the main deck, and especially the secondary battery; the latter, mounted on swinging grating platforms, are quite unprotected, the former only partially. The hatch immediately above the temporary sick bay is large enough to allow the use of a cot for lowering wounded from the main deck above. To get them from their stations to this cot, they would simply have to be carried by one or two stout men. The frequent narrow doors and passages, with the exceedingly high thresholds or coamings, would prevent here, as almost everywhere else in the ship, any other mode of transportation than this primitive one. It is a mere matter of guess how long this cot would remain available under a hot fire, but failing this (the corresponding hatch on the starboard side being closed, with the torpedo tube in action) the other hatches on the berth deck would have to be used, the wounded being carried in arms.

If it is difficult to convey the wounded hither from these comparatively accessible regions, from others it would be practically impossible. In the four minor turrets the only means of egress is the small port in the side, through which the wounded man would have to be passed, as he could not remain inside without interfering with the service of the guns. He would then be on the upper deck, to be disposed of as above. In the larger turrets it has been shown by experiment that a helpless man, with another to support him if necessary, might be sent down on the ammunition car. On arriving at the bottom he would find himself in the "handling room," whence he might be removed to a mattress in an adjacent passage and there be visited by a medical officer (for he could not be brought up) to do what was necessary to save life at the moment. Of course these accommodations are very limited, but the number of men in these positions is small and they are not so liable to casualty. In like manner any injured among the engineer's force could be disposed of temporarily in the shaft alleys, the surgeon in both cases proceeding below, if necessary, through the engine room, if one of the heavy trap doors has been left open, though the steepness and narrowness of these ladders would hardly allow wounded men to be carried up. According to this plan, ample preparations would have to be made before going into action, mattresses put in every available space, with antiseptic dressings, tourniquets, etc., and the usual force of the "surgeon's division" largely increased, both officers and men.

It is to be observed that nothing of all this can really be tested, and under actual conditions of warfare probably other methods would be extemporized; but in so important a matter as care of wounded it appears best at any rate to recognize the obstacles, many of which would, it is to be feared, prove insuperable. It is now said that, under the conditions of modern warfare on land, certain services are providing the soldiers themselves with the appliances for life saving, and instructing them in their use. Without experience, I can only say that this theory seems to be the correct one, and I would add that a necessary adjunct to every squadron would be a hospital ship, which at any rate after an engagement might, by agreement, be allowed to remove wounded, and either furnish facilities for their proper treatment in itself or carry them to land.

VENTILATION.

The apparatus for artificial ventilation in use on board this ship consists of four Sturtevant blowers, contained in small compartments on the orlop deck, within the armored space. These supply air to the ship generally, its living spaces, storerooms, and passages, another system ventilating the fire rooms and engine rooms, and furnishing forced draft in the former.

The four first mentioned, each with its separate engine, are of the following dimensions:

	Inches.
Diameter of steam cylinders (2)	4
Stroke	3
Diameter of piston rods	$\frac{7}{8}$
Diameter of fan	48
Width of fan	19

They are arranged by means of reversing valves so as to exhaust from or force air into the various parts of the vessel, through the usual system of trunks with pipes and louvres. The supply method has been the only one in use. Experience has shown that the ventilation of the ship as a whole has been very unsatisfactory, under the conditions that especially require it, viz, in very hot weather, under full steam, and when battened down in bad weather or cleared for action. This defectiveness of ventilation, in my opinion, is the most serious sanitary fault of the vessel; the causes are several, some easily remediable, others, it is to be feared, not without great cost.

In the first place, the blowers now in use require to be worked to very nearly their full capacity, certainly not less than 600 revolutions per minute. With very strict attention this is of course possible, but it requires the most constant oversight, and, it is stated, a man of intelligence constantly present, with also a liability to frequent breaking down of the machinery. The distribution of air is imperfect, as a great many of the pipes are bent at such an angle in passing through the numerous bulkheads as to present great resistance by friction, and many of these pipes are too small. In the larger trunks many of the openings, or louvers, are given off directly from their upper surface, the air requiring great pressure, with no indraft or current into practically air-tight storerooms. The multiplicity of auxiliary engines on the ship (not less than 80), the passage of steam pipes for heating and other purposes throughout, as well as the complication of small compartments, tend to create obstacles to the supply of cool air from the outside. In cold weather this great internal heat is of itself almost sufficient to secure a rapid change of air by escape through natural openings, and there is comparatively little difficulty; but under the circumstances attending the squadron drill in August last, when even the water outside the ship rose to the extraordinary temperature of 80° F. (not in the Gulf Stream), the imperfections of the apparatus were very manifest. Some facts have already been stated as to the heat in the living quarters at this time, and the inconveniences arising from the steam steering engine on the platform deck aft were mentioned. It is hoped that a plan for the remedy of this particular defect has been made. The dynamo room and adjacent passages were especially overheated.

The only present means of improving the ventilation of the living spaces appears to be the enforcing of a minimum speed of the blowers of 600 revolutions and furnishing force of men to secure that.

It has been further suggested that besides the arrangement for separate ventilation for the steam-steering room it may be possible, even in this vessel, to add other blowers, and divide the supply of air already furnished into independent systems, thus overcoming the resistance to supply which seems the main cause of the deficiency. It is stated that larger blowers, with a 60-inch fan instead of 48, could be substituted for those now in use. The fact of this deficiency is, however, insisted on here, in the hope that in future construction attention will be called to the necessity of installing a sufficient apparatus for so important a need. In particular, both supply and exhaust should be used simultaneously in certain compartments.

The engine and fire rooms are, as already stated, ventilated independently of the rest of the ship. In each of the two engine rooms is a Sturtevant ventilating fan similar to those just spoken of. These can be used instead of the large shaft provided for natural ventilation. The fire rooms are furnished with 10 blowers for forced draft, those for the main fire rooms with a 60-inch fan, those for the auxiliary with a 36-inch fan. Observations of temperature in the fire rooms and engine rooms are given here, taken from the steam log, as representing approximately the maximum and minimum, at sea, in the same locality, under dates of 9th of August and 10th of December, respectively. It will be understood that even the highest figures given hardly represent the full exposure to heat of officers and men, and indeed, judging from reports of some other vessels, this fire room is not unusually hot, yet the effect on the engineer's force during that week in August was very marked, and I think they could not have done their work many days longer, but would have needed double the force to enable them to divide the hours of labor.

Temperature, taken hourly, in engine room and fire room, for twenty-four hours, August 9, 1896; at sea and at anchor in Hampton Roads.

Time.	Engine room.	Fire room.	Time.	Engine room.	Fire room.
	°F.	*°F.*		*°F.*	*°F.*
A. M. 1	110	140	P. M. 1	112	158
2	110	140	2	114	158
3	110	140	3	115	155
4	110	140	4	115	155
5	111	140	5	115	155
6	112	140	6	115	155
7	110	140	7	115	140
8	112	140	8	115	135
9	114	140	9	115	135
10	110	140	10	115	135
11	110	140	11	115	135
12	110	140	12	115	135

Temperature, taken hourly, in engine room and fire room, for twenty-four hours, December 10, 1896; at sea, passage from New York to Hampton Roads.

Time.	Engine room.	Fire room.	Time.	Engine room.	Fire room.
	°F.	*°F.*		*°F.*	*°F.*
A. M. 1	93	95	A. M. 12	97	95
2	93	95	P. M. 1	100	95
3	93	95	2	100	95
4	95	95	3	100	95
5	95	95	4	100	95
6	95	95	5	100	95
7	95	95	6	100	95
8	95	95	7	100	95
9	93	95	8	95	105
10	96	95	9	95	105
11	98	95	10	95	105

WARMTH.

The ship is warmed by steam, coming from the main boilers, and the pipes are divided into several systems, so that, for instance, the officers' quarters or berth deck can be shut off without affecting other portions. The main deck (within the superstructure) is supplied with coils, as well as the decks below, and the vessel is efficiently warmed. Recently the officers' staterooms have been supplied, as already stated, with small individual coils.

LIGHT.

The artificial lighting is by electricity—the Edison system—three dynamos on the orlop deck furnishing the power. On only one or two occasions has this service been interrupted, necessitating a return to candles for a day or two. The dynamo room is usually one of the hottest regions of the ship, and it may be mentioned here that it has been observed that the men (usually apprentices) detailed for work there are very liable to acquire defects of vision. On several occasions it has been found necessary to recommend their transfer to other duty after a stay of several months, and in one or two instances where men have presented themselves for reenlistment, having performed duty in the dynamo room on other vessels, it has been found that their vision, recorded as $\frac{20}{20}$ at prior enlistment, had so far deteriorated as to require waiving of the defect by the Department. I believe also that I have observed other cases among officers and men, not matters of record, which show the necessity of very great care in the ordinary use of this powerful light for reading and writing, and particularly is this noticeable in the warrant officers and the paymaster's clerk, who are obliged to use it continuously. It has been recommended that no one shall be employed in the dynamo room over three months at a time, and that the lights there, necessarily very brilliant, be softened as much as possible by ground-glass shades.

WATER.

Two Baird distillers with two (Baird) evaporators are used. They are supposed to have a maximum capacity of 5,500 gallons a day, and an ordinary capacity of 4,000, but from one cause or another they usually fall below the latter. The water produced has always been of excellent quality, the necessary precautions being taken; but the preparations for storage evidently leave something to be desired, as it has not been uncommon to find water, even distilled, appear below the proper standard both chemically and in appearance. The tanks are only three in number, and are too large, the three, of nearly equal size, containing about 14,000 gallons. When the bottom has been reached, a considerable sediment of iron rust, which may cover other deposits, has sometimes been observed. Although no disease has thus far been traceable to the drinking water, it requires, in this report at least, no argument to prove that the very highest standard ought to be maintained. I venture to suggest one improvement in the storage, viz, to have tanks lined, as bath tubs and other iron vessels are, with the so-called "porcelain." If they were smaller and more numerous, there would be less risk of a temporary fault in the distilling apparatus causing contamination of a large quantity of water before discovery.

Shore water has been frequently used, the public supply in almost all the ports so far visited being of good quality. It is not to be denied that with the large consumption of fresh water necessary for health and cleanliness, there is great difficulty in hot weather in distilling enough, and in cooling and aerating it, so that it shall be palatable to the men. Under such conditions, and although I am of the opinion that no natural source can equal properly distilled water in quality, I see no objection other than the occasional inconvenience of even changing drinking water, to using the supply already tested in large communities; moreover the water of harbors is often unfit for distilling.

The ice machine, which, as already stated, cools the water in the scuttle butt, as well as supplying cold storage and ice, is of the "Allen dense-air" pattern, with a normal capacity of 1 ton of ice per day, or of 200 pounds of ice, when at the same time keeping the refrigerating rooms near the freezing point, and cooling 300 gallons of water to 40° F.

It is satisfactory except during very hot weather, as in August last, when, with the ship under steam, with the consequent heat of the part of the vessel in which it is situated, it proved insufficient.

The clothing of the crew is generally satisfactory from a hygienic point of view, and, in particular, extra attention has been paid to providing a suitable supply of waterproof clothing and rubber boots.

I think the disuse of the white canvas hat is to be regretted, for in hot weather it is far preferable to any other head gear I have yet seen for lightness, durability, and convenience.

The limited range of this ship's cruise during the year, and the already well-known characteristics of the few ports on our own coast visited, seem to render unnecessary any further allusion to their sanitation. Only one death has occurred on board, that being due to suicide by shooting with a revolver.

The immediate motive—the only one apparent being chagrin over a not serious disciplinary trouble—seems too trivial to suggest such an act to a normal mind, but his mental peculiarities had never been such as to call the attention of the medical officers, although he had been on the sick list for a slight surgical injury a few weeks before.

The personnel of the vessel is generally very good, the petty officers being as a rule young and of a robust physique.

Great attention is paid to athletic training and development, not only by means of regular calisthenic exercises and employment of apparatus, such as clubs, dumb-bells, boxing gloves, rowing machines, etc., but by special encouragement of such sports as football, baseball, and, of course, rowing. There can be no doubt of the value of this system, both physically and particularly as an aid to contentment, enthusiasm, and quickness of apprehension and action—all that is included in the general term morale. The more direct military advantages, such as an added training in prompt obedience, concerted effort, aiding the personal influence of officers over men, etc., need not be specified here.

The great unequalness of temperature necessarily arising in cold weather from the heating of the vessel by steam is the inevitable cause of catarrhal affections of the lungs and air passages, tonsillitis, etc. Whereas in former days the diseases of seamen were apt to be those arising from direct exposure to hardship, they are now assuming more and more the character of those in any civilized community. It is recognized that arctic travelers and others exposed habitually to intense cold do not "catch cold," whatever their other sufferings, until they return to comfort. I believe also (though the actual returns may not yet seem to bear out the impression, taking little account, as they do, of obscure elements of causation) that the great change in construction of naval vessels and the substitution of machinery for all sorts of manual labor, involving a change of duties, and even of personnel, will produce a corresponding change in varieties of disability incurred. An instance of this has been mentioned in reference to the dynamo room and electric light.

The total disuse of sails and almost total disuse of pulling boats may be in a measure compensated for by the athletic exercises spoken of above, but the fact remains that the crew of a modern ship are soldiers and mechanics rather than sailors, while still confined to a ship. It would perhaps be of little value to speculate on future results, and the subject is only mentioned as an additional argument for the encouragement of all outdoor sports as a sanitary measure.

Malaria in its protean forms, acute and chronic, figures largely in the returns of sick, but its influence is seen apart from cases which require the patient to be relieved from duty. This observation, which will, I believe, be considered trite by experienced medical officers of the Navy, has been well illustrated on board this ship by the example of the marine guard, most of whom, at the beginning of the cruise, had come directly or indirectly from Washington. The frequency of the return of paroxysms, usually intermittent, more or less severe but commonly amenable to treatment among these men, was very noticeable. Any unusual exposure to cold, wet, or fatigue, even in a place free from malaria, would produce them, while many, even of those not often affected, showed unmistakably in other ways their acquired diathesis. In connection with this, and with the whole subject of malaria as it has occurred on board this vessel, I have read with interest the last reports published by the Surgeon-General of the Army, from which it appears that during the past two or three years there has been a manifest increase of malarial cases in the northern and eastern army posts. I have particularly noticed a tendency to fevers of a remittent or subcontinued type, in some instances not much influenced by quinine, which often present very high ranges of temperature, and are of altogether uncertain duration, when treated on the spot where they have arisen. I am aware that it is claimed that such cases are in reality to be classed as typhoid fever. I can only say that during many years I have been accustomed to see typhoid fever as it usually prevails in our service, that is, often differing as widely as possible from the type formerly laid down in books. These cases are masked, as I believe, in the beginning and throughout the first week, or longer, by malarial manifestations, and are often without the progressive rise and decline of temperature, without delirium, rose spots, and abdominal symptoms, even diarrhœa, when it existed, being of quite a different character. Yet they are undoubtedly typhoid, being attended with the lesions thereof, and, above all, running a definite course, usually, under favorable circumstances, of twenty-one days, and always showing to the experienced attendant the characteristic facies and general appearance, more or less marked, the prostration, hebetude, and commonly after convalescence, the characteristic sequelæ—partial loss of hair, slow recovery of mental and muscular strength, etc. The cases now in question differ from these essentially. While the fever is continuous and often very high, there is a notable absence of hebetude and prostration; the patient in many cases neither feels nor looks seriously ill, even after a considerable duration of the disease.

In some cases the recovery was as prompt and unexpected as the attack had been. I lay less stress on the absence of or difference from most of the so-called typical symptoms of typhoid fever, because, as just stated, these are so often absent. It is not suitable here to enter upon an argument, and I will therefore merely state that these dubious cases, of which probably everyone has seen isolated examples, have been more frequent here than in my previous experience, and that while they appear in some respects to resemble cases quite recently reported by Dr. DeCosta and considered by him to be "simple continued fever," they have usually occurred among persons with more or less of a malarial history. I have therefore, but with hesitation, classed them among remittents, which they most resemble. The treatment of most effect has appeared to be evacuant, sedative, and tonic. The removal of the patient to a different locality has in some previous cases been soon followed by convalescence.

The undoubted cases of typhoid fever mostly followed the (surreptitious) use of Delaware River water for drinking, while others succeeded a stay of at least some days on shore, in cities.

REPORT ON THE U. S. S. BROOKLYN.

By W. S. Dixon, *Surgeon, United States Navy.*

The *Brooklyn* was commissioned December 1, 1896, and since that date has remained at the navy-yard, League Island, Pa. As the ship has been commissioned only one month and the crew has been on board less than that time, references to many features must be reserved for a future report.

The sick bay seems to be an unsatisfactory and ill-chosen place for the treatment of the sick. It is situated in the extreme forward portion of the berth deck and divided by an athwart-ship bulkhead into two parts. The forward section is so encumbered with stanchions (eight in number) for the support of the weights on the deck above, that it will be possible to swing only a single cot at sea if the ship should roll very much. There is space for two additional cots, but only when the ship is in harbor.

The paint room is directly underneath this section. The hatch leading thereto is immediately below the space where it is possible to put a cot at sea and have abundant swinging room, but, owing to the sometimes pungent, disagreeable odors coming from below, even that location will be untenable, probably, by a sick man. The paint room, therefore, not only destroys utility, largely, of forward sick bay, but a passageway must be kept for the painter and his assistants in the after sick bay. If their visits be frequent, as is probable, a serious annoyance to very sick men is inevitable.

The after sick bay will accommodate 4 cots. The aggregate cot accommodation is rather meager for a ship containing a crew of 500 men. The bay, as a whole, is well lighted, heated, and ventilated. Adjoining the after section of the sick bay are dispensary and bathroom, the latter communicating directly. In the bathroom there is also a water-closet. Hot water is not supplied to the bath tub, and, as it is essential, there should be a way of heating water in the tub by steam. It could be readily done and at slight cost.

The heavy anchor cables pass along the deck above the sick bay, and their lockers are not many feet away. Thus far we have had no practical demonstration of the possible ill effects of such an arrangement, but a very ill man might easily be greatly affected by the noise incident to getting up or coming to anchor.

The sick bay defects were not reported to the commanding officer in writing, because they are inherent, and such a report would have been a matter of supererogation.

It seems strange that in the construction of this great ship so little thought should have been given to the environments of the sick.

The necessities surrounding construction of a modern war vessel compel the placing of a network of pipes in many parts of the ship, yet the distribution of such as convey steam might be better than obtains within and in the immediate neighborhood of the surgeon's room. No less than 75 feet of steam pipe (heating) are very close to the berth—some of it within 2 inches and none of it more distant than 40 inches. Five pipes pass through the room and 4 are separated from it only by a thin metal bulkhead. Until the 5 pipes (45 feet) had been additionally covered with felt, one could not sleep in the bunk. With an outside temperature of 19° F. that of this room was 90° F., as determined by reliable thermometers, and the air duct was delivering cold air in the room at the time. In one of the double-berth rooms of the junior officers two thinly-covered steam pipes pass along the whole length of the upper berth and in such close proximity that a man of ordinary proportions could scarcely crowd in between mattress and pipes. It would be impossible for anyone to sleep there while steam was being used to heat the ship.

In the artificial ventilation of the ship, the present plan is to supply fresh air and not extract the vitiated. Judged by the olfactory test, it seems to be the preferable plan.

The number of sick during December was small—only 20 admissions—and the causes quite trivial. Five cases of parotitis epidemica—the contagium having been brought from New York—were transferred to hospital.

Notwithstanding the abundance and liberal supply of distilled water on board, many men, especially of the engineer force, drank, by preference, water taken from the Delaware. It was stopped so soon as discovered, but many cases of diarrhœa resulted. Whether more serious consequences are to follow, remains to be seen. The river at this point (League Island Navy-Yard) contains the sewage of Philadelphia, and must be extremely filthy.

A fatal accident of more than passing interest occurred on December 20 to a male visitor to the ship. In attempting to step from side of gangway to the deck, he lost his footing and fell head downward outside the ship. Before reaching the water his head struck a projection on the side of the ship about 20 feet below the gangway. He remained in the water, head submerged, a considerable time, and when brought on board was pulseless and not breathing. Though he had the appearance of death, Laborde's method of artificial respiration—rhythmical traction of the tongue—was immediately tried and supplemented by the Sylvester movements. Within twenty minutes breathing was faint and labored. At the end of half an hour all aid to breathing was discontinued, but unconsciousness remained. As breathing increased in depth, stertor also became more prominent. Pupils were widely dilated and blood oozed from mouth, nose, and ear. Pulse became full and bounding. Face and neck assumed a livid hue. It was then assumed that a fracture of the skull existed and that the brain was lacerated. At this juncture an ambulance from a civil hospital reported in answer to call and the patient was removed. He did not regain consciousness, and died within a few hours. The peculiarity of the case was the complete restoration of the respiration after supposed drowning, the skull being crushed and the brain extensively lacerated.

I believe the Laborde method the best means we have in resuscitating the apparently drowned, and as its application is easy it should certainly be used, if not alone, at least in conjunction with other methods.

REPORT ON THE U. S. S. MASSACHUSETTS.

By C. A. SIEGFRIED, *Surgeon, United States Navy.*

The *Massachusetts*, first-class battle ship of nearly 11,000 tons displacement, was commissioned June 10, 1896, at League Island, Pa., but for several weeks after that date a large number of workmen was engaged in completing the ship. It was on August 4, after fifty days' experience of the hot atmosphere of summer at League Island, that the ship got to blue water and a fresher environment.

From August 6 to 20 the ship remained at Hampton Roads, Virginia; from August 23 to 31 at New York; from September 4 to 16 at Newport, R. I.; September 19 to October 4 at New York; October 3 to 27 at Hampton Roads and vicinity, with short sea trips; from the beginning of November to the end of the year at New York and vicinity, and finally the navy-yard. The number of days at sea was 23.

The *Massachusetts* has 2 large gun turrets on the main or gun deck, 1 forward and 1 aft of the superstructure, and 4 gun turrets on a higher level and connected with the superstructure, 2 forward and 2 aft. A battery of 4 guns is located on the gun deck within the superstructure, 2 on each side, the side armor there varying in thickness.

It is fair to presume that in a serious engagement the men at the secondary battery and the 6-inch guns would suffer most severely, leaving the men within the large turrets still effective. The surgeon's principal stations or bases in battle, two in number, are necessarily situated in the vicinity of the side torpedo-firing tubes, where varying armor protection exists. The sick bay is abandoned in action; likewise the officers' quarters.

The only wood decks are those of the main deck, in the open, forward and aft of superstructure. All other decks are of steel plate covered with linoleum. All bulkheads and doors are steel, and sliding doors at many places of thin plate. There are armored doors in casemate, in addition to water-tight plate doors. Corrugated iron bulkheads are in locations for simple divisions merely. Cork paint is universal. Ash-wood (fireproofed) furniture and fittings are in officers' quarters and generally, excepting in commanding officers' cabin, where mahogany is used. There are 4 main boilers (fires end on) and 8 fire rooms. There are 10 blowers in the engineer's department, one for each engine room and one for each fire room. There are about 86 separate engines throughout the ship. The superstructure occupies the middle third of the ship, and here, above the main deck, are the superstructure and flying decks. There are 16 double-bottom compartments, and the whole number of compartments in the ship is 340.

The personnel is composed as follows:

Captain and wardroom officers	16
Steerage and warrant officers	15
Seaman branch	232
Artificer branch	10
Artificer branch, engineer department	98
Special branch	10
Mess men	28
Marines	60
Total	469

CORK PAINT.

Over the metal bulkheads, ceilings, and all the exposed surfaces within, the so-called "cork paint" is applied. I have frequently called attention to the character of its application, and particularly in a special report while serving on the *Cincinnati* in 1894. I have only to reiterate my objections, that it is not efficiently or properly applied, and hence does not well accomplish the object of preventing rapid conduction of heat and cold and condensation of moisture; its rough, uneven surface collects dust, and the hardened projections of paint form so many thorn-like points, a constant source of small skin wounds. I do not see the utility or reason for using cork paint on metal, both sides of which are inboard and exposed to the same temperatures, as thwartship bulkheads and room partitions, for instance. Put on carefully, cork paint is all that is claimed for it, preventing condensation or sweating, and it has a pretty even, fine surface; but finer grains of cork must fill up the interstices and valleys left by the first layer of coarser particles. In some foreign ships the cork is laid on in thin, smooth sheets. I have seen beautifully applied cork paint in some foreign ships, effective for its intended purpose, and not a thorny surface.

The lineoleum on the steel decks is a firm, protective, and agreeable covering. It is laid down with a cement containing some rubber. It requires shellacking at least once a fortnight. At doors rubber mats take up extra wear. It is easily patched and repaired.

LIVING SPACES.

Considering the type and character of the vessel, the living spaces are fairly roomy and well ventilated. They are lighted by the usual electric system, and in cold weather warmed by steam radiators. In exceptionally cold weather it is difficult to warm the spaces next the skin of the ship. Ceiling and lining of much better nonconducting materials must be applied before this difficulty will be overcome. It is not unusual to find a difference of 8° in the temperature of the two sides of a bunk placed against the ship's side. When the temperature of the outside air is 70° F. or above, parts of the superstructure and center of ship are excessively warm, but at anchor and with the minimum of fires in the engine department, the heat is not as a rule unbearable. When coaling ship, or on occasions requiring all the four winches on deck at work, the steam pipes leading about the ship greatly increase the heat. This type of ship can not be expected to be cool or to be easy on her actively laboring force of men below when steaming in moist, warm weather, or in the Tropics. In fact, the conditions then will tend to the rapid physical exhaustion of the fire-room force.

Enough experience has accumulated to show that the old system of bunks alongside ship's skin is unsafe, on account of the nearness to the body of the sleeper of a very cold surface in cold weather and a very hot one at times in summer. A plan has been reported upon, and recommended to be installed here, of substituting folding metal bunks athwartship for the present ungainly bunk structure. An additional chest of drawers, built in, will compensate for the loss of stowage space under the old bunk. Many of the officers' staterooms in the more recent battle ships are entirely inboard, and the above difficulties do not prevail. Eight junior officers and the warrant officers are in single and double staterooms inboard without hatches or air ports, but with good artificial ventilation.

The paymaster's office, a good-sized inboard room on the berth deck midships, is made very disagreeable and unwholesome because of the excessive amount of heat and moisture from the large steam pipes, with open joints and valves, leading through to the large cranes overhead. It is also the berthing space of the clerk, and is a source to him of ill health and debility.

The wardroom officers' lavatory has had taken from it the space necessary for a warrant officer's stateroom, thus losing the two douche baths. This stateroom and the paymaster's office are among the warmest spaces in the ship, and the temperatures there rarely fall below 90° F. The highest temperatures consecutively noted were in the dynamo room, on the next deck below, where the average of highest records was 115° in summer.

Thermometric records of the living spaces are reported daily to the commanding officer. I have selected 13 stations or locations, including the various berthing spaces and quarters, prisons, the maximum warm and cool compartments, and the decks below. The data are regularly collected at 6 a. m., 2 p. m., and 9 p. m., and the report includes one humidity observation. By this report the general condition of the ship at any time can be easily seen. I have found this scheme a valuable one and have practiced it for the past three years.

Cubic capacity of the living spaces.

Location.	Number of occupants.	Total capacity.	Air space per man.
		Cub. ft.	*Cub. ft.*
Wardroom staterooms	15	6,346	423
Wardroom mess room	15	3.247	216
Junior officers' staterooms	12	2.400	200
Junior officers' mess room	13	2,114	162
Warrant officers' staterooms	3	1,010	336
Warrant officers' mess room	3	1.460	489
Berth-deck compartments	208	43,480	210
Gun-deck compartments	196	21.641	110.8

The cabin quarters consist of two staterooms, bath and toilet room, mess room, pantry, and country. In rear of these a triangular torpedo compartment forms an agreeable lounging and smoking room. The total capacity is about 8,600 cubic feet.

The berthing spaces in the various compartments and wider passageways, while on the whole allowing of an average of 150 cubic feet per man, do not give much room, because of the many awkward corners caused by the metal constructions and shapes. These interfere and project in so many directions that the swinging room is limited. In the cold season about 75 men sleep below in the ammunition passages;

and, on the contrary, in the summer the flying and superstructure decks are fully occupied, awnings being stretched over them. An additional number of hammock boxes in the open air has been recommended, to prevent the stowing below of 60 hammocks (a most reprehensible practice not yet altogether avoided in battle ships). When hammocks can not be stowed in the open, they should be much oftener brought up and aired.

THE CANTEEN SYSTEM.

There has been recently established a canteen system, including the supply of beer and small stores, groceries, and provisions generally. The rations for the crew are commuted to the extent of 50 per cent, and thus additional supplies can be purchased at wholesale and regularly issued to the messes. The profits from the beer and small stores are considerable. With these profits accruing to the men, the dietary is completed and varied. As circumstances require, stores, such as beef, vegetables, and daily fresh allowances, the price of which is regulated by contract, are also purchased or drawn from the paymaster. The net result seems to be the saving to each man of the usual mess contribution of $3 per month, the greater variety and change in diet, the feeling of freedom of choice, and the canteen advantages. On the other hand, the experience may be very different without the present ample purchasing facilities of a great metropolitan city. With a smaller crew the system might also fail to work satisfactorily. The "canteen" is also an important factor of success. However, here at New York, or probably in any one of our large ports, the system is and should be successful. On the whole, the men seem to be pleased. Messes have the same food throughout, and this may become a source of objection. But the crew undoubtedly, for the same amount of money expended, get more food and a greater variety, with probably a better quality, than by the usual methods, which include a certain commutation of ration in money from the paymaster, and individual catering, by the messes themselves or their cooks, from small dealers at exorbitant retail prices.

The undertaking is a distinct advance and, though at present crude, may progress to a better system and a permanent improvement in crews' dietary and economy of subsistence. A change in cooking arrangements is not the least of the benefits. The old mess cooks become simply mess attendants and the 6 cooks now added to the galley force (and 1 baker) attend to the preparation and cooking of all the food. It has long been known that the chief cause of waste and inferior messing and dieting has been due to the ignorant mess cooks, often selected haphazard and usually dissatisfied. The enormous profits of bumboat dealers, reaching in a ship of 470 men to from $30 to $50 per day, has possibly helped to call attention to the economic advantages of a properly conducted canteen system. An officer in charge and a storeroom, office, and one or two competent men to assist, are necessary.

I must add that it is my impression that, under stress of the conditions of war in strange waters and without suitable market facilities, our crews would keenly feel the sudden loss of variety of diet and the canteen they now have. They may and do become unused to the regular naval ration, and many of the men will no doubt at first, when solely depending on it, suffer indigestion. This, however, can not be an objection to a canteen system whenever it is feasible, as it must to a great degree add to the contentment and comfort of the men.

In this connection I may say that the regular navy ration should be improved by allowing a little more of the albuminate and fatty elements, and preferably, in my opinion, by the addition of a properly made fatty meat sausage and a sound cheese, issued alternately. In other words, there is not enough fat and flesh in our ration. A better class of cooks and more of them are also necessary. The crews of our ships are as wasteful of food materials as our people on shore are, and use but little if any more skill, as a rule, in selecting and preparing them for consumption.

VENTILATION.

In full and constant operation—that is, with the 4 blowers running at and above 400 revolutions per minute and supplying air—the ventilation of the ship (for a single-tube system) is good. The exceptions are the firemen's lavatories, the officers' water-closets, and the steam-steering room. These compartments should be fitted, as is the dynamo room now, with a double-tube system, so that both supply and exhaust air currents may be provided. It would require the addition of No. 4 electric blowers, one each for the firemen's lavatories and officers' water-closets. Plans for the improvement of the steam-steering room are being considered.

The No. 4 electric blowers in the dynamo room are very efficient, and illustrate well the feasibility of ventilating compartments, or in fact the whole ship, in separate sections, by these smaller electric blowers. By this method the use of steam pipes would be obviated, and also the great amount of radiant heat from them, inseparable from the present single-tube general system with from 2 to 4 large blowers, as well as the difficulties and lack of ventilation in large sections of the ship when one or more blowers happen to be under repairs. One blower under repairs means no ventilation in one-fourth of this ship, and a gradually increasing foulness, very evident by the second or third day to all in that section of the ship.

It is essential, in order to procure the best performance from the system in this ship, that the 4 large Sturtevant blowers, which are located in the middle third, 2 forward and 2 aft, be kept at about 400 revolutions per minute. There being at one time, in the early months of the cruise, some difference of opinion regarding the management of the ventilating system, supply or exhaust, rate of speed of blowers, and so on, I reported to the commanding officer that, in my opinion, for the best hygienic results, the blowers should always supply air and be run at a speed of not less than 400 revolutions per minute, except when the outside temperature was below 35° F., when 300 revolutions would answer, or when coaling ship, when they should not be run at all during the hours of coaling. The builders who installed the blowers and system of ventilation, when appealed to in relation to the speed of the blowers and economical working and results, replied in the following letter, which I am permitted to quote here:

> Replying to your recent note I beg to say, that while the Sturtevant ventilating blowers on your ship can be run at 500 revolutions per minute, we have found that the best results can be accomplished by running them at 450 revolutions. We therefore recommend that you have them run at the latter speed.

Hence, it is now our established rule to manage the ventilating system as above indicated, and with gratifying results. By supply (plenum method) the tubes are kept clean and clear of dust and fine débris, inevitable when the exhaust plan is pursued to extract the air from such a close overoccupied structure as is the modern ship, with all its manifold activities. The quality of the air (a most important point) is by the plenum method always good, as the outside pure air is delivered at all the outlets throughout the ship, instead of a second and third hand already polluted air, when the exhaust system is in vogue, filtering down and over ladders, decks, damp unclean surfaces, mess gear, stores, clothing, and so on, a good percentage of its oxygen probably gone by the time the men (in some cases several decks below) come to use it. The direction of the general current of air by the supply method is always up and away from the ship; and, in the warmer months the air supply is cooler and more refreshing.

The 4 large blowers have each a theoretical capacity of 10,000 cubic feet per minute and a diameter (fans) of 48 inches. The greatest number of revolutions obtained on trial was 520. In view of the statements quoted in the above letter from the builders, and, I may add, from an experience in several of our more recent vessels with Sturtevant blowers, it does not appear that one is warranted in stating, as I have frequently heard, that the high speeds of revolutions (400 per minute) rapidly destroy the blowers. It does, however, require careful mechanical management and supervision, and this is always attainable. The great importance of this matter of good air throughout these complex modern ships is too self-evident to be questioned, as it bears immediately on the health and strength of the personnel.

Much care in placing louvers and outlets was taken, and the air current in most instances is directed toward the distal end of the space, so that "air flushing" is usually accomplished. Where the air stream is directed toward a door or other opening, without chance of diffusion, a sheet of tin placed 10 inches away from the louver attains this object. The tin, in sheet, has the edges cut in strips to form 4 corner supports, which are attached to the rim of the brass louver, the air diffusing in 4 directions, between the 4 supports.

Brass louvers are fitted to all pipes; butterfly valves to main pipes at water-tight bulkheads and to coal-bunker exhaust pipes; automatic valves, where ventilating pipes pierce the protective or berth decks, and below armored decks, where they pierce bulkheads or decks; slide valves in magazines; Ludlow valves in trimming tanks; and automatic valves with armor gratings where the large pipes pierce the armored decks.

The dynamo room has a separate system of ventilation, composed of two No. 4 electric blowers, one on each side of the compartment, the after one with its tubes supplying air through an upper-deck shaft, the forward one extracting into a similar upper-deck shaft. There are 4 openings to each side, and great volumes of air are supplied and removed. The doors of this compartment should be kept closed, and care in producing thorough diffusion of the air constantly exercised.

The coal bunkers have the usual natural draft system, the uptakes leading to the funnels for extraction and the supply openings leading from the hammock rails. It is totally unconnected with the ship's general system.

The two engine rooms and each fire room have separate blowers, supplying an ample current at all times. In addition to this forced supply, a great stream of air has been noticed, set in motion when the ship is under way and certain doors left open, through the 13-inch turrets and lower passageway, leading from the base of the turrets directly through the lower parts of the ship from forward aft. It can be said that during the warm months of July and August, under way, temperatures above 120° F., were not noted. As a rule the temperatures of fire and engine rooms are rarely over 115° in the warmer months. In the case of the steam-steering room, the plan of cutting a trunk shaft directly up from that compartment to the open air, though urged at various times and by the board of inspection, has not been acted upon. The plan to be carried out is to force hot air into a contiguous shaft alley which can not then be used to rescue the men by any mishap imprisoned there. It is doubtful if by this plan the great heat and moisture of the steering room, under way, can be reduced, or the heat in the compartments and quarters, on the deck overhead, much diminished. All the usual deck openings in this part of the ship, as well as forward, must be closed in any sea way. The only exit or entrance for air is then by way of the superstructure, shafts, and funnels. All of the bits on this outside main deck are hollow, and are fitted with screw movable caps, and these, in some instances 21 inches in diameter, furnish additional channels for air exhaust from various compartments, and are valuable aids to ventilation at sick bay and men's water-closets.

To anyone doubting the fact of the extremely dirty and dusty character of the air in all spaces below decks in our ships, I would commend the simple experiment of running a small electric fan in any given space for a few hours, lightly anointing with vaseline the edges of the blades. As a rule a black carbonaceous slightly-adhesive mass of fibrous dirt and dust will be gathered, which demonstrates how readily the exhaust system of ventilation would clog up and interfere with the valves and tubes, and also how necessary good and free ventilation is to the preservation of a good physical condition.

The air ports are 13 inches in diameter in the clear. On the main deck aft 3 hatches, each 39 by 84 inches, lead to the officers' quarters and lower decks. Skylights are located over the 6 inner staterooms, the 2 mess rooms, and commanding officers' center passage or country. Similarly forward of the forward turret, leading to the berth deck, are 2 large hatches (84 by 72 inches), and 3 smaller ones (36 by 57 inches), 2 ventilating shafts (12 inches and 18 inches), and the large hollow bits with removable tops. All these main deck openings must be closed and heavily secured in moderately bad weather at sea, the comparatively low free board of the ship allowing the sea full access at such times to the main deck forward and aft of the superstructure.

Improvements are being planned for the better ventilation of magazines, contiguous passages, and hydraulic rooms.

The largest unventilated space in the ship is the lower hold, the main hold having been divided horizontally, the upper part containing the louvers. The spaces under the 8-inch turrets are also unventilated, and, being used as bag rooms, are with difficulty kept free from odor. The regular bag rooms below are well-ventilated, fine compartments. Ditty boxes, now made of uniform size and pattern, are stowed in metal racks in various parts of the ship.

There are 4 large hatches in the superstructure (40 by 84 inches) from berth deck to main deck, and to superstructure deck 4 more of same size. The smaller flying deck is gained by 2 long, steep iron ladders between the funnels. The ventilation is good throughout this whole superstructure. The 6-inch guns and the large galley are located on the gun deck in this inclosed structure, with parts armored about the guns. There are also the various engine hatches and uptakes from that department, some workshops, the armory, and two offices.

WATER SUPPLY.

The distilling capacity, though theoretically about 6,000 gallons per day, is rarely beyond 2,500 gallons. The consumption for personal uses is about 1,600 gallons daily, giving each man what he reasonably desires. The contemplated changes in the distilling and condensing plant should increase the capacity. It is the usual apparatus of Navy Department design, and the quality of water supplied is excellent. I keep set up in the dispensary the volumetric analysis burettes, and the amount of sodium chloride in any sample sent up by the engineers on watch is quickly determined. When the amount of standard silver solution used exceeds 5 cubic centimeters (to strike the reaction, using an indicator), the water is rejected as containing too much salt for safe or agreeable use. It is rare that over 2 parts of salt have been found, but as much as 12 parts per 100,000 have been observed and the defects in joints or from leakage remedied. The fault may not be in the apparatus itself, but in tanks, pipe connections, and bad cleaning methods. By examining samples from various points the source of contamination can be found and corrected. The tanks may often spoil a pure water delivered to it from position of manhole plates, manner of keep, and carelessness. Here the manholes are on the side and the plates are not disturbed unless for the regular cleansings. The inlet pipe enters at top and outlet or supply below, and the cement lining and all parts are carefully inspected after the cleansings. The ship's water capacity, by 3 tanks, is 13,818 gallons. Trimming tanks on an emergency might be used, but these have been kept empty. The regular water-tank supply would give each man in the company, at a gallon daily, twenty-nine days' supply, or, if put upon the most economical health basis, for 78.5 days.

The ice machine and refrigerating rooms are in satisfactory operation and use. In the warmer months additional ice must be purchased, as the machine's capacity diminishes as the heat increases.

BATHING FACILITIES.

These exist for the officers in form of the regular bath tubs, and for the junior officers two rain or douche baths in addition. The lavatories for the firemen, in two compartments, contain 24 fixed basins and 4 douches overhead; for the crew forward only 6 hand basins and 3 douches overhead—rarely used on account of drainage difficulties. No method of supplying hot water is provided, excepting where upon special request, as in sick quarters, a small steam pipe has been led into the tub, tapping an adjoining steam radiator. In the officers' lavatories the difficulty is to procure cool water, as the pipes are always overheated in that part of the ship. The officers are also supplied with individual tubs in their rooms, and these are generally used. Fresh and salt water is supplied baths and lavatories. All baths, lavatories, and pantries drain into two tanks placed on the orlop deck, and from them the contents are pumped overboard. These tanks frequently get foul and collect sediment, which, decomposing, has given great trouble in cleaning. Lime chloride has had to be used before the men could enter them to remove the muck, and upon two occasions gases and vitiated air have overcome men. It is a faulty system, and projected changes will keep out the pantry drainage. It seems to be impracticable now to run these drains directly overboard, and thus do away with the collecting tanks entirely.

WATER-CLOSET FACILITIES.

For the officers there are two compartments provided on the berth deck inboard; near the engine-room bulkheads. The Bishop pattern of air-pump closet is used, and, as is always the case, these require constant care and watchfulness from the plumber. The number of closets to persons is in the proportion of one to three and a fraction. As elsewhere stated, one electric blower should be installed in these compartments, to exhaust the air from both spaces. In each compartment there are two louvres of the general ventilating system. The drainage is directly overboard.

For the 438 men of the personnel forward, there is provided a small common head in two sections, running athwart ship, next the bow torpedo compartment, and containing only 14 seats, or 1 to each 31 men. On account of the overcrowding, and for the sake of cleanliness and decency, I recommended to the inspection board, in October, that more room and seats be provided. Still later the commanding officer pushed the matter, and finally plans are being prepared to construct and install 12 additional seats, space being gotten from the adjoining torpedo compartment.

In public institutions, ashore, it is rare that there is one seat for more than 15 persons. Where it is possible to do so in ships, not more than 18 should be the rule. When completed, the improved water-closet compartment for the crew will allow one seat for about 17 men. An additional hatchway will also be provided for direct entrance from the deck, in so much improving the general sanitary condition of that part of the ship. This great sanitary improvement in this ship is especially noteworthy and is heartily to be commended.

PRISON CELLS.

These are 2 in number, large, square compartments, forward on berth deck, each with an air capacity of 420 cubic feet, 1 ventilating louver, and a perforated door. Prisoners are also confined on the orlop deck. These localities for prisoners involve no unnecessary hardships. It is the custom to give prisoners confined more than nine days a quick-walking exercise in the open air twice a day, of fifteen minutes.

SICK QUARTERS.

These are located forward on the berth deck, under the anchors, and on the starboard side, taking up one-third of the second thwartship compartment. The bulkheads, as is usual throughout the ship, are of steel plate, and the deck is covered with linoleum. As permanent fixtures, there are a desk with two series of small drawers, an upright chest of 6 drawers for surgical instruments, a flat cabinet for daily dressings, against ship's side, a book shelf, and a convenient set of file cases.

Very properly the sick bay is isolated, and at no time need be a thoroughfare or passageway to some storeroom, paint shop, or other part of ship, as is so frequently the case in our ships. The first purpose of a sick bay is to isolate a sick man for diagnostic purposes and treatment. In case of infectious disease, if isolation is impossible, a sick bay on board ship is of but little use.

The dispensary is outside the sick bay and adjoining. It has been well fitted with ash-wood racks, shelving, locker, and counter with small drawers. A transom with locker room is provided for the apothecary's personal use. An air port, 13 inches diameter, a small radiator, and a stoneware hand basin, with salt and fresh water taps, complete this handy compartment.

The bathroom is forward of the sick bay proper, and it is fitted with iron-porcelained tub, salt and fresh water taps, and steam jet for warming the water. There is also a hand basin and a Bishop's water-closet. It contains 1 ventilation louver, and the air is always good. The floor is cemented, and is easily kept clean. Buckets and wash gear are kept on shelves off of the deck.

The sick bay proper contains 2 air ports, a door at opposite ends, 2 ventilating louvers from the general system, and a large hollow bit (21 inches diameter in the clear), in the deck above, with a removable screw top, serving as an uptake ventilating shaft. A very large anchor bit passes down through the compartment, around which in heavy weather there is some leaking from the deck above. Under the usual conditions in port the sick bay is an agreeable, dry, light, and wholesome compartment, well warmed by steam radiators in the cold months and ventilated and cooled by electric fan and louvers in the warmer months. In moving the heavy chains overhead the noise is of course deafening, but ordinarily this part of the ship can be kept quiet. On recommendation the openings into the opposite compartment have been closed recently by thin metal plate over brass lattice. A lattice swing door has also been put in sick-bay doorway leading to berth deck. A filter of 1-gallon capacity hourly (by gravity) was also allowed by the Bureau, none having been supplied in the outfit. A filter may be very necessary, as quite often the water supply may be from navy-yards or the tanks be faulty; when for pharmacy uses, as well as for the sick, filtered water would be very desirable.

A recommendation has been approved that 4 permanent pipe-iron bunks be put up in the sick bay, in two tiers, one over the other, and the work is to be done at the yard (New York). By this means a more economical use of the space can be made, as the floor area to be used will be only 30 inches by 12 feet 6 inches. The lower two berths are to be 12 inches from deck, with about 34 inches between upper and lower beds. The structure is to be white enameled.

I would recommend a more general use of such permanent iron bunks for the sick in our ships, as being economical of space, cleanly, and far more comfortable than the baggy cots. These latter may on occasions still have a use for additional beds and for swinging patients elsewhere in a ship; or on those very rare occasions at sea with heavy weather (not yet seen on this ship). It requires a gale to cause any great motion in this ship.

SICK QUARTERS, CAPACITY AND FLOOR SPACE (FURNITURE SUBTRACTED).

Sick bay proper, capacity	cubic feet	1,988
Sick bay area, floor space	square feet	238.1
Bathroom, capacity	cubic feet	335
Bathroom area, floor space	square feet	19.5
Dispensary, capacity	cubic feet	320
Dispensary area, floor space	square feet	18.5

MEDICAL STOREROOM.

Upon going in commission no suitable shelving was found in the storeroom. The space is ample (capacity of 578 cubic feet), and proper shelving and a spirit locker have now been provided. There is one ventilating louver, and the room is dry and without fault. It is located on the orlop deck, port side forward, and the hatch leading to that series of storerooms is in the adjoining compartment to sick bay.

SURGEONS' STATIONS IN BATTLE.

The ship, when cleared for action and the men at quarters, is emptied of her personnel at the ends, outside the casemates, above the protective decks. The men most exposed are on flying and superstructure decks, in secondary battery, signalmen, and navigator's section. On the gun deck, at 6-inch guns, there is some protection from armor on ship's side. On the berth deck, near the after torpedo tubes and within casemate, have been located the two surgeons' battle stations. These are provided with large chests of dressings, cases of instruments, and quantities of aids-to-wounded packages and appliances; besides the ambulance stretchers and folding operating table. A medical officer and bay men are assigned to each. From these only available locations all parts of the ship can be reached in a few minutes, and the only hatch and ladder left open leads from the gun deck below. The regular aids to wounded in each division are systematically taught their first aid duties and how to assist in every possible way the medical department in transport and care of wounded. Those wounded in the turrets can not be taken out while in action, excepting possibly those from the base of 13-inch turrets, who can be treated in near-by passages. From the 8-inch turrets it would be very difficult to remove a badly wounded man, as the ports in rear of the guns and the hatch below are small. However, all the turrets are nearly impregnable under ordinary conditions.

From all other locations the wounded can be more readily transported. No protected space exists below capable of holding more than a very few wounded men, and as the berth deck forward and aft of the casemate offers the only space for this purpose, transport of wounded and injured to them would not be done until after battle. The ladders being spacious, transport below at leisure would not present any difficulties.

The wounded must first be, to some extent, helped where they fall, and means to this end are provided for each division and section of men all over the ship, the men themselves being taught the use of the "first-aid packets," rubber tourniquets, triangle, and bandages. Two or three times weekly, and at general quarters, drills and instructions are carried on in "aids to wounded" in small sections. In previous reports I have dwelt somewhat in detail upon the methods regarding position, transport, application of tourniquets, restoratives, and the manner of hand carrying by one, two, or more men as may be needed. With the side bars removed from the "Wells stretcher" and a series of lines run from the side to a stout ring over the center of the stretcher, I know of no better contrivance to remove a sick or wounded man from deck to deck or from below out of a ship. Shortening or lengthening the side lines to the ring permits of any posture or degree of recumbency. The transverse slatting procures its proper rigidity. The contrivance was gotten up by a seaman on the *Colum-*

bia about a year ago. Where a man is so lightly wounded as to permit of the application of one of the numerous stretchers often pictured, the patient being secured in an upright position, I would prefer a simpler, less painful method and transport by hand. Badly wounded and shattered men, in my opinion, can not be safely handled by these complex contrivances, and such methods are not practiced here. And again, admitting their applicability, in time of action there are no available men to work these affairs.

According as is the type of ship, disposition of battery, available space for surgeons' battle station, size and position of hatchways, where removal below is at all desired, so must be the plan and method by which the wounded may be best aided and attended by the medical officers. It is admitted, and it is of the utmost importance to their lives, that the wounded should be removed from a ship as soon as possible after a battle, and to hospital on shore, or to a hospital ship. Hence the problem of care and management of wounded in battle must be individualized and the methods studied out and applied separately. The one thing sure is the broad fact that rapid-fire guns have shortened the time of naval engagements and in that degree increased the probable casualties in a given time. In future the first few minutes of a close engagement will, in all human probability, result in a confused mass of débris and destructive carnage, wherein the utmost efforts of the surgeons will avail but little. From the accounts of one present, the loss on the Japanese cruiser *Matsushima* at the Yalu fight from the explosion of one large shell alone counted up 49 wounded and 53 killed. Casualties may certainly be expected in about 33 per cent of the personnel engaged from all that we can surmise from the lists of killed and wounded in naval battles since 1865. With the advent of rapid-fire guns of large caliber, sufficient to pierce all but the heaviest armor, now present in nearly all modern naval vessels, a combat between two or more evenly matched ships would after a few minutes in all probability be attended by a very large number of casualties.

A NAVAL HOSPITAL ORGANIZATION NEEDED.

The importance of improving the medical department of our naval service is more and more apparent, in view of the recent advances in the methods and rapidity of killing and wounding. The great want is a body of trained bay men or nurses, and these should be better paid and of better stamp and fiber. Now and then we procure a good man, and proceed with his training as a bay man. He soon finds opportunity for betterment in some one of the various departments of the ship, in the matter of pay and emolument, either in some yeoman's billet or in some place whereby his meager $18 per month can be suddenly increased to $30, $40, or even $60 per month. The bay man, who should be an intelligent, sober man, and well trained in many things pertaining to nursing, dieting, ambulance, and aids to wounded, and have a moderate amount of education, finds his pay at present among the lowest in the ship's company; even the men caring for storerooms get more per month.

Good work in the medical department of a ship insures the minimum amount of lost time in a crew from a host of causes.

Hence it is advisable to institute a properly trained and improved hospital organization. There are few if any military and naval services now without such an organization, and the very successful United

States Army Hospital Service is a good model for us in forming such an organization, properly modified and adapted to the naval service.

MEDICAL OUTFITS.

Before joining the North Atlantic fleet the 14 boats were supplied with medical-boat boxes, which I designed to be of half-inch soft pine and 5 by 7 by 13 inches in the clear, with sliding top fastened by one rounded-head screw. On the inside of the lid is pasted a complete list of the contents and their uses in simple language. The officers in charge of boats are instructed how to use these simple remedies, aids-to-wounded articles and dressings, and the boxes are always in their charge—in their staterooms or with them in the boats. Though this box may easily be made smaller, it is not safe to do so on account of the necessary glassware, which is packed and secured by the oakum and soft dressings. A smaller box could be easily designed and furnished ships on requisition, made of thin, durable, pliable materials with rounded corners, metal boxes and flasks containing the tablets and liquids, yet there must be space for some amount of bulkier materials for surgical dressings. The wooden box above described is small, light, and compact. Soft half-inch pine is far better than any harder, handsomer wood, as it is of light weight and wears well.

For containing the aids-to-wounded gear among the guns' crews and throughout ship at general quarters I use a heavy canvas square bag (12 inches) with flap and handle. In a section of 24 men, for instance, such a bag contains 4 first-aid packets, 3 rubber and a few screw tourniquets, and 6 bandages. The bag is appropriately marked with Geneva Cross and the name of the section where it belongs. The regular aids to wounded in each division take care of these bags, and they are easily kept neat and white.

A NEW FOLDING, PORTABLE, GENERAL SURGICAL OPERATING TABLE FOR USE ON NAVAL VESSELS.

It being impossible to transport to the surgeon's battle station or about the ship the old wooden operating table or even to preserve it intact under rough usage, and being desirous of possessing a metal modern operating table that would at once fulfill all purposes on board ship and be suitable for expeditionary forces ashore for use at a base hospital, I have designed and had made for this ship a metal folding and portable operating table. It has been approved by a board appointed by the Department, upon the recommendation of the Bureau of Medicine and Surgery, and it is hoped that our newer, larger ships particularly may be supplied with them. In its canvas case folded for transport it measures 60 by 24 by 3½ inches, and set up in position 72 by 24 inches, standing 31 inches high, sloping to 30 inches at one end. It is rigid and firm. The top is slightly concave longitudinally with a drainage depression in the center leading to one end and through by a short pipe below. There are two stirrup-rod attachments for holding the knees in the lithotomy position. A detachable end piece adds the extra 12 inches of length. It is easily and quickly folded, occupies but little space, weighs 90 pounds, and is finished in enamel white. The table is necessarily simple in design and construction and is much less in price than the usual surgical operating tables seen ashore not portable. Its compass folded for transport is small, and I believe it is the only model of such a table for use in naval vessels.

For stability, the feet of the slightly spreading legs are fitted with corrugated rubber sockets, and the concave top tends to hold the patient. Its plan of construction for strength and rigidity is based upon the strong sheet-metal top, 60 by 24 inches, rimmed with a 2-inch vertical steel strip, and all the other parts—legs, braces, and attachments—depend upon and are attached to this top. It is contained in a heavy canvas case strengthened with leather corners.

A smaller metal folding instrument table is also designed to go with the above operating table. It has a smooth flat top 16 by 26 inches supported on 4 legs of half-inch pipe, and it stands 30 inches from the floor. The top is secured to the supports by two hinges on one end and is held secure by a hook at the other end. The legs have a spread of 20 inches on the floor, with heavy rubber sockets. When folded for transport the table is 36 inches long by 18½ inches wide and 3½ inches thick. It is finished in white enamel.

REPORT ON THE U. S. S. MINNEAPOLIS.

By D. N. Bertolette, *Surgeon, United States Navy.*

The ship has been a part of the squadron on the European station during the whole of the year and has cruised in the Mediterranean Sea, the Atlantic Ocean, the German Ocean, the Baltic Sea, and the Gulf of Finland. The time actually at sea was sixty-seven days, during which, the weather being generally fair, there was no unusual exposure. The ports visited, with the length of stay in each, were as follows:

Alexandretta, Asia Minor, —— to January 6, six days; Smyrna, Asia Minor, January 10 to January 20, ten days; Mersina, Asia Minor, January 23 to February 10, eighteen days; Alexandretta, Asia Minor, February 11 to February 14, three days; Mersina, Asia Minor, February 15 to March 1, fifteen days; Taranto, Italy, March 5 to April 14, forty days (in the dry dock thirty days); Naples, Italy, April 15 to April 27, twelve days; Gibraltar, Spain, May 1 to May 2, one day; Southampton, England, May 7, a few hours; Cronstadt, Russia, May 13 to June 19, thirty-seven days (twelve days in dry dock); Helsingfors, Finland, June 22 to June 29, seven days; Stockholm, Sweden, June 30 to July 8, eight days; Copenhagen, Denmark, July 11 to July 18, seven days; Christiania, Norway, July 19 to July 25, six days; Frith of Forth, Scotland, July 27 to August 6, ten days; Gravesend, England, August 8 to August 17, nine days; Southampton, England, August 18 to August 28, ten days; Queenstown, Ireland, August 29 to September 7, nine days; Tangiers, Morocco, September 11 to September 14, three days; Gibraltar, Spain, September 14, a few hours; Genoa, Italy, September 18 to October 2, fourteen days (three days in dry dock); Smyrna, Asia Minor, October 7 to November 23, forty-seven days; Mersina, Asia Minor, November 26 to December 3, eight days; Joppa, Syria, December 5 to December 11, six days; Smyrna, Asia Minor, December 14 to December 21, seven days; Alexandretta, Asia Minor, December 25 to December 31, six days.

The total number of days in port was two hundred and ninety-nine, in widely distributed localities, with consequent exposure to the many varying climatic and local influences, under which the ship's company suffered to the extent of 4,533 days' sickness, being 2.56+ per cent of the general effectiveness. Eighteen men were invalided to the United States. There were no deaths.

The greatest source of disease was venereal infection, as evidenced by the list of 146 recent cases requiring treatment during the year, besides which there have been 40 cases of consecutive syphilis which were receiving constitutional treatment, for a longer or shorter period of time, without being excused from duty. Among those affected with venereal sores there were 22 whose groins were incised because of suppurating inguinal glands. Various forms of treatment were tried in the cases of gonorrhœa, with no marked difference in results, while none of the much vaunted "abortive" treatments were in any degree successful as far as immediate cure was concerned.

A large proportion of the venereal disease was contracted at Taranto, Italy, where the vessel made a stay of forty days, thirty of which were spent in the dry dock there, and during which time the men were granted liberty every night. Taranto is the seat of one of the national shipyards of Italy, and a garrison town as well, where large numbers of men are assembled for military purposes, and where, nominally, prostitution is under official supervision.

Another prevalent disease affecting unacclimated persons at Taranto is a peculiar remittent fever of indefinite duration, probably the same disease as the so-called "Malta" or "Mediterranean" fever. It is marked by a persistent high temperature and great prostration; and while no deaths occurred among the cases which appeared on board as the result of our stay, fatal cases have been reported from other ships serving in the Mediterranean.

The locality is such—a lagoon, with marshy surroundings, communicating with the sea through a very restricted opening in the long narrow strip of land which separates it from the sea and upon which the town is built, the larger part of whose sewage empties into the landlocked waters—that it is reasonable to ascribe a paludal origin to the disease, although quinia and other antiperiodic remedies, even in very large doses, have no apparent influence upon the progress of the disease. The men of the Italian navy assembled at this station suffer greatly from this affection. About the time of our arrival there the Italian fleet which was anchored in the lagoon had so many men affected that the vessels were moved to an anchorage in the open roadstead outside the lagoon to avoid further infection. As a commentary upon the salubrity of the place, it is stated that the Italian sailors are cautioned, when in the town "on liberty," to walk in the middle of the street, and thus avoid as far as possible the emanations from the basements of the dwellings.

While in the Baltic Sea a number of the crew were affected with grippe, an epidemic of which it was learned was just coming to an end in that region. Here, too, several cases of articular rheumatism appeared. It is said that rheumatism is a prevalent affection in this region.

During the year several men were invalided to the United States as with tuberculosis.

There were three cases of appendicitis treated during the year. In one the abdomen was opened and the patient recovered fully. Since recovery this individual, while lifting a heavy weight, produced an inguinal hernia in his right groin, in no way, however, connected with the cicatrix of the abdominal incision. A second case of appendicitis appeared in October, but was not operated upon. He was kept at rest on his back with ice applications over seat of disease, while gentle purgation was kept up with calomel and magnesium sulphate The man is now on duty.

The third case was somewhat obscure in its manifestations; there were recurring attacks, but the man being transferred from the ship the case was lost sight of.

A case of blindness of central origin, in a coxswain, coming on after an epileptic fit, was invalided home after it had been ascertained that the man had been subject to epileptic seizures for several years, a number of attacks having occurred while he was attached to this ship, but which had been successfully concealed by the connivance of his shipmates.

The ship arrived at Smyrna October 7, 1896, during the prevalence of an epidemic of smallpox, the deaths being about 90 a month, the disease being confined generally to the poorer part of the population, who were not protected by vaccination. Precautionary sanitary regulations were put in force and the whole crew at once vaccinated. The vaccine matter, lymph in capillary tubes, was obtained by telegraphic order from the Swiss Vaccine Institute at Geneva, Switzerland, and was so effective, 193 successful in 459 revaccinations, that it is worthy of the highest commendation. It was most promptly supplied and at a very reasonable cost.

Vaccination was performed by making two abraded places about half an inch in diameter on the left arm, using an ingenious device, devised and made extemporaneously by P. A. Surg. M. F. Gates, consisting of 4 or 5 stout steel needles firmly fixed in a row in a wooden handle, forming a sort of long slender-toothed comb. Several of these were prepared, and immediately after one was used it was passed to an assistant, who cleaned the points and sterilized them in the flame of an alcohol lamp, ready for use again in its turn, and thus every vaccination was made with a freshly sterilized instrument. There were no cases of serious inflammation or abscess following the operation.

An embarrassing case, and one which was the source of great anxiety for a few days, presented itself in a young sailor just arrived from the United States, who was extensively affected with pustular acne of the face, and who, twelve days after liberty on shore in Smyrna where smallpox was prevailing, complained of severe frontal headache, pains in small of back and in the flexor muscles of the legs, accompanied by a high fever—reaching 105°—with a sudden fall of temperature late on the fourth day. The large crop of acne papules and pustules was carefully examined during several days, but no traces of vesicles or umbilications could be found, and the patient being otherwise apparently in good health, he was sent to duty. The man had been vaccinated on the receiving ship at New York about a month prior to his arrival on this station.

An unusual habitat for the pediculus pubis was found in a man who complained of irritation of the eyes. Upon examination pediculi were found on the edge of the lid, while a number of the eyelashes had the characteristic egg capsules adhering to them. Insects and nits were removed by mechanical means. There have been very many cases of infection with pediculi pubis among the crew. Removal has generally been effected by local application of a solution of bichloride of mercury, 1–500.

The general sanitary condition of the ship has been good; the construction of the vessel, however, precludes hygienic perfection. The main deck, immediately under the superstructure, where the mass of the crew are berthed, is especially defective because of the daily necessary wetting to keep it reasonably clean; the other living spaces in the ship have shellacked decks, and can be kept clean with a minimum amount of water.

A great improvement could be made, as recommended in my last year's report, by moving the living quarters of the officers to the main deck and berthing the crew on the gun deck below. A board of officers has been at work planning a rearrangement of quarters for this end.

The transportation of wounded to the sick bay is so difficult that in time of battle it would become impracticable. At the present time, during exercise at general quarters, a "dressing station" is established in the ward-room mess room, aft, with a medical officer and one bay man in attendance, the principal station being, as usual, in the sick bay, forward, with one medical officer, the apothecary, and one bay man. All transportation of the injured has to be left in the hands of persons not belonging to the surgeon's division. There is absolutely no protection for the injured in time of battle; the only protected places in the ship are in the space below the water line, under the protective deck, access to which would be impossible with the ship in action, and under such circumstances the only resource will be to gather the wounded in places where they will least incommode the working of the battery and wait until after the action, and then those who are left, if any, may be attended to properly.

REPORT ON THE U. S. S. COLUMBIA.

By E. Z. Derr, *Surgeon, United States Navy.*

The sick days numbered 1,485, with a daily average of 4.06+. Malarial fevers contributed 77 sick days, and venereal troubles 185. Twenty-six cases were sent to hospital. Of these, 3 were transferred for malarial fever, 4 for pneumonia, 3 for syphilis, 1 for typhlitis, 2 for neurasthenia, and 2 for hernia. No deaths occurred on board during the year.

The sanitary condition of the ship has been excellent. The bilges and water-closets receive close attention and are kept in good condition. The ventilating system works well, and a good current of air passes through the various louvers. Bedding is aired at regular intervals, and the men are exercised when circumstances permit. The decks, with the exception of the superstructure, are kept well shellacked, thus preventing undue moisture. The superstructure deck should be treated in the same manner. This is the main living deck, and about half the crew berth there. The ventilation being defective, the atmosphere is charged with moisture for a long time after the deck is washed down.

VENTILATION.

1. *The superstructure.*—This deck affords berthing space for about 236, and is very badly ventilated, notwithstanding its great height above the water line.

The cubic air space is estimated at 40,000 feet. This great space is wholly dependent upon natural ventilation, and to supply this there are 4 hatches (2 of them quite small), 2 doors opening forward on the forecastle, and 2 opening aft on the passageway leading to the quarter-deck, and a number of round ports situated high up on either side. These means are insufficient to keep the atmosphere in proper condition, and it is recommended that the artificial system of ventilation be extended to this deck, and that the round ports be replaced by square ones of the same dimensions as those on the gun deck below.

2. *The dynamo room.*—The temperature of this compartment ranges from 110° F. to 125° F. The ventilation is inadequate, and could be greatly improved by increasing the size of the up-take ventilating shaft. The berth-deck compartment above the dynamo room is rendered almost useless in warm weather for berthing purposes on account of the heat radiating from that source.

3. *The steam steering room.*—The temperature of this compartment sometimes exceeds 120° F., and the ventilation is very defective. A direct communication through the protective deck would greatly improve the atmosphere of this part of the ship.

QUARTERS.

The officers' staterooms, situated on the gun deck opposite the engine-room bulkheads, are rendered very uncomfortable in warm weather by the heat radiating from the engine-room space. These bulkheads are sometimes heated to a temperature of 105° F., and the adjoining staterooms to 95°. This high degree of heat in living compartments could be greatly reduced by lagging the bulkhead with asbestus or magnesium plates. The angle irons in position would seem to indicate that such was the original intention. The staterooms abaft the mess hall, six in number, are very pleasant in summer, but in severe winter weather are too cold for comfort. The radiating surface in the wardroom country is not sufficient to keep them at a pleasant temperature.

SUMMARY OF THE CRUISE.

During the past year the *Columbia* has been attached to the North Atlantic Squadron, and has spent most of the time in the waters of New York and Hampton Roads, with an occasional trip to sea for drill. During the month of July about three weeks were spent on detached duty. On the 7th of that month the ship was ordered to Castine, Me., to participate in the celebration at that place; thence to Boston, where several days were occupied with the naval militia. This completed, orders were received to convey the *Passaic* to Brunswick, Ga. Passed Assistant Surgeon Braisted was detailed for duty on board the *Monitor*. In the month of September ten days were passed at Fishers Island, drilling on shore, after which the squadron returned to New York waters. On December 5 the *Columbia* was ordered to the New York yard for repairs

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REPORT ON THE U. S. S. LANCASTER.

By C. G. Herndon, *Surgeon, United States Navy.*

The ship has remained in the River Plate since February 13. The only port visited besides Montevideo was Ensenada, Argentina. There is nothing of interest to report about Ensenada, it being a very small place, serving as a deep-water port for Buenos Ayres. It is situated about 40 miles by rail and 12 by water from the latter place.

No epidemic has been encountered, except influenza.

Only one death has occurred—a debilitated fireman, who had pneumonia of a most asthenic type.

INVALIDING.

It has been found necessary to invalid home a number of men, many of whom could have been retained on the station had there been available a suitable hospital.

There is a singular dearth of hospitals here where our officers and men can be well taken care of when it becomes necessary to send them out of the ship.

HOSPITALS.

The Italian hospital, a comparatively new establishment, on the outskirts of the city (Montevideo), is very well situated, but upon a recent visit I found there were no private rooms, properly speaking. It contains a number of 4-bed wards, in which an officer might be placed, but if there was a demand for quarters he would have to share the room with others or the Government would have to pay four charges, if it was deemed necessary to keep him in a room to himself. Then, too, the difference in language, dissimilarity in customs, etc., make this hospital practically out of our reach.

The Caridad is only allowed to receive charity patients.

The British hospital is a small and old building, with rooms and wards opening on a patio by doors; when the weather is stormy and these are closed the supply of air is cut off. One general ward has windows looking out on the water; in this the tubercular cases are placed.

This difficulty would be largely obviated if our ships in the Plate were sent to Buenos Ayres to winter, instead of remaining in the exposed anchorage at Montevideo. In the former place is a large hospital, the British, with grounds in which patients can exercise. The climate of the Argentine city, too, is far milder than that of Montevideo. The ship would occupy a berth in the docks, thereby avoiding much of the exposure encountered in the performance of duty here.

Experience during our stay here has shown that men with chronic rheumatism do not do well on board ship, no matter how carefully they are treated and nursed. Some of them improve for a time, but with a spell of wet, damp weather the pains and stiff joints return, and it becomes necessary to send them home.

At the present time 3 of these cases are under treatment, 2 of them confined to bed; they are not progressing rapidly toward recovery. The climate here is very damp, as can be seen by a glance at the meteorological records.

VENEREAL DISEASES.

Four cases of constitutional syphilis are reported in which the infecting sore was acquired by tattooing. These 4 men were all infected by 2 professional tattooers in Buenos Ayres. The chancre in each case was on the arm.

FOODS.

Food here is abundant, cheap, and of good quality. Fresh meats, poultry, eggs, fish, fruits, and vegetables are obtained in quantities. The nutrition of the men is excellent.

WATER.

Only condensed water is used for cooking and drinking.

BERTHING THE CREW.

Probably never before in the service of this ship has she had so small a complement of officers and men (246), and consequently the cubic space per man has never been so great.

CARE OF THE TEETH OF ENLISTED MEN AND APPRENTICES.

I desire to call the attention of the Department to this very important subject, as on board this ship the same trouble that is common in ships' companies in cold and damp localities is of almost daily occurrence, viz., toothache, due to dental caries. Oftimes the amount of decay is small, and had the tooth been filled while the man was on the receiving ship he would have been free from attacks of toothache, which, with the frequently present complications of swollen face and jaws, renders him unfit for duty for days at a time. I would advise that a dentist, rated as apothecary, be kept on board each receiving ship, and that as soon as a man is enlisted he should be sent to the apothecary-dentist and have useless teeth and roots extracted and the less-affected filled. The Government takes such excellent care of sick and wounded men that it seems undoubtedly proper that this matter should also receive attention; it seems to be clearly in the line of taking care of the health and comfort of the men. Absence of the teeth is a justifiable cause of rejection, consequently if all aching teeth were extracted many men would in time be rejected on that account. These remarks are especially applicable in the case of apprentices.

APOTHECARIES.

The apothecaries now being appointed are, as a rule, an excellent set of young men, and some of them accomplished chemists. I think, however, that they should be sent to a naval hospital and be taught the practical duties of nurses and ward masters prior to being detailed to seagoing ships. The naval hospital, New York, and the United States Naval Laboratory and Department of Instruction form now a post-graduate school for recently appointed assistant surgeons. I would suggest the propriety of having classes of recently appointed apothecaries sent there for training in the very important duties of nursing sick and injured men. When we remember that many of our ships have only one medical officer, it can easily be seen how important it is that the apothecary should be a qualified nurse. This training they do not have prior to their appointment, and they can not acquire it on receiving ships; the wards of a hospital alone can afford the necessary training. A man qualified to nurse a case of typhoid fever or pneumonia on a seagoing ship is of the greatest value to the medical officer. In this ship, during the present cruise, we have had to treat and nurse these very diseases.

BAYMEN.

Baymen should be supplied from a trained hospital corps, as has been so strongly urged by the present Chief of the Bureau of Medicine and Surgery, and not sent on a seagoing ship in many cases totally unable and unfit to do duty among sick and injured men. Since this ship was commissioned I have known of two cases where the so-called baymen were found to be unable to stand the sight of the most trivial operation.

REPORT ON THE U. S. S. MAINE.

By L. G. HENEBERGER, *Surgeon, United States Navy.*

Owing to the short time I have been attached to the ship, the sanitary notes embodied in this report are necessarily incomplete. Happily, the comprehensive report of my predecessor, which appeared in the report of the Surgeon-General of the Navy for the year 1896, on the general construction, arrangement, ventilation, etc., of the ship, viewed from a sanitary standpoint, makes it unnecessary to refer to those subjects. Attention may, however, be called to the fact that two evils mentioned therein, namely, insufficient water supply and absence of means of refrigeration, have been remedied. The old evaporator has been removed, and two new ones of the design of the Bureau of Steam Engineering have been substituted. These have a rated capacity, each, of 3,500 gallons. The daily output of both, however, is only about 4,000 gallons. Yielding this amount, and when the process is not pushed, the water is good and potable. Beyond this there is apt to be carried over some saline matter.

Since the beginning of last year an ice machine has been installed on board, which, it seems, is satisfactory in cooling the water in the scuttle butt, in refrigerating the cold-storage room, and in furnishing ice for all necessary purposes.

Summary of cruise.

Ports visited.	Date of arrival.	Date of departure.	Days in port.	Days at sea.
Fort Monroe, Va	-------	Jan. 9	8	1
Newport News, Va	Jan. 10	Jan. 11	1	-------
Fort Monroe, Va	Jan. 11	Jan. 30	19	-------
Newport News, Va	Jan. 30	Feb. 1	2	-------
Navy-yard, Norfolk, Va	Feb. 1	Feb. 5	4	-------
Fort Monroe, Va	Feb. 5	Mar. 6	30	-------
Newport News, Va	Mar. 6	Mar. 7	1	-------
Fort Monroe, Va	Mar. 7	Mar. 10	3	2
Do	Mar. 12	Apr. 21	41	-------
Navy-yard, Norfolk, Va	Apr. 21	June 2	42	4
Fort Monroe, Va	June 2	June 4	2	-------
Key West, Fla	June 8	July 30	51	4
Navy-yard, Norfolk, Va	Aug. 3	Aug. 25	22	1
Tompkinsville, N. Y	Aug. 26	Sept. 1	6	3
Fishers Island. N. Y	Sept. 4	Sept. 16	12	3
Tompkinsville, N Y	Sept. 19	Oct. 1	12	4
Fort Monroe. Va	Oct. 5	Oct. 12	7	2
Tompkinsville, N. Y	Oct. 14	Oct. 23	9	-------
Navy-yard, N. Y	Oct. 23	Nov. 27	35	-------
Tompkinsville, N. Y	Nov. 27	Dec. 21	24	1
Newport News, Va	Dec. 22	Dec. 24	2	-------
Fort Monroe, Va	Dec. 24	-------	7	-------

As will be seen by reference to the above summary, the greater part of the first and second quarters was spent in and about the waters of Hampton Roads. Nothing of special sanitary interest happened during that time.

During the first quarter there were 71 admissions to the sick list, principally from diseases incident to climatic changes of the season—bronchitis, tonsillitis, pharyngitis, and rheumatic troubles. Four patients were transferred to the naval hospital at Norfolk, Va. The average complement for the quarter was 372; the total sick days 631, giving a daily average of patients of 6.934 and a percentage of sick of 1.86.

During the second quarter there were 82 "admissions;" 30 were malarial in origin, and were admitted to the sick list while the ship was lying at the navy-yard at Norfolk, Va. Four patients were transferred to the naval hospital at Norfolk, 3 suffering from venereal disease and 1 from febris enterica, this being the second instance of the appearance of this disease since the beginning of the year. The origin of the fever was not apparent in either case. Both were transferred to hospital.

The average complement for the quarter was 371; the total sick days 528, giving a daily average of patients of 5.802 and a percentage of sick of 1.561. On June 4 the ship sailed for Key West, Fla., remaining there until July 30. In spite of the hot weather prevailing at this season, the health of the ship's company remained fairly good. At this time an epidemic of smallpox prevailed on shore, concerning which the following note was made in the medical journal:

> While the ship was on duty at Key West, Fla., in July, 1896, smallpox was declared epidemic in that city by State and local boards of health. Although the ship was anchored nearly 2 miles from shore, every precaution was taken to prevent infection by vaccinating the entire personnel, by stopping "liberty," and by restricting all intercourse with the shore except what was necessary to carry on the business of the ship. Owing to these precautions the ship escaped infection and was given a clean bill of health on its departure July 30, 1896. August 3 the ship arrived at Norfolk, Va., from Key West, to go into dry dock. It remained there until August 25, during the excessively hot weather which prevailed at that time, and sailed September 1 for Fishers Island, to take part in the shore drills there.

The average complement for the third quarter was 358; the total sick days 835, giving a daily average of patients of 9.07 and a percentage of sick of 2.53. Eight patients were transferred to the naval hospital at Norfolk, Va.; 1 with melancholia, to the United States Government Hospital for the Insane, at Washington, D. C.; 1 to the naval hospital at Chelsea, Mass., and 4 to the naval hospital at New York.

The fourth quarter was spent at New York and Hampton Roads, going to sea twice for fleet evolutions. There is nothing to note of sanitary interest during that time. The health of the ship's company was good—better than for any previous quarter—the daily average of patients being 5.11, and the percentage of sick 1.389. Four patients were transferred to the naval hospital at Norfolk, and 2 to the naval hospital at New York, during this quarter.

REPORT ON THE U. S. S. MARBLEHEAD.

By E. H. Green, *Surgeon, United States Navy.*

The health of the ship's company has been exceptionally good during the past year, notwithstanding most of the time was spent on the

Syrian coast (Mersina), where the climate was trying and opportunities for liberty were few. I would still urge the necessity of a suitable sick bay. Just abaft of the dispensary is the junior officers' mess room, a space that would conveniently accommodate 6 men in hammocks or 4 in cots; a door could be cut from the dispensary directly communicating with this space and that opening from the passage of the lower wardroom rooms sealed. For more than three-fourths of the cruise there have been but one or two junior officers, and they have messed in the wardroom. Should the Department deem this ship as too small for a full complement of junior officers, and devote this space to a sick bay, it would add greatly to the comfort and care of the sick. In a ship that is otherwise so comfortable and habitable the lack of a proper sick bay strikes me as being the one great defect.

During the year the ship visited the following ports: Mersina (five times), Smyrna, Beirut, Latakia, Suediah, Alexandretta (twice), Corfu, Venice, Trieste, Messina, Catania, Palermo, Genoa, Gibraltar, Madeira, Bermuda, and New York, naving been sixty-five days actually at sea and having cruised about 14,300 miles. While at Alexandretta and Suediah I saw two or three cases of a skin disease that seems to be peculiar to that region. The nature of the disease seems to have baffled very able physicians, as has its treatment. The "bouton d'Aleppe" occurs in the neighborhood of Aleppo and in a section of country through which flows the Orontes River. This gives color to the belief that drinking the water from that river has something to do with the disease. The disease appears as a hard, purplish lump, generally on the face, though the same subject may have two or three "buttons" scattered over the body. The inflammation is dull and indolent, and it is three or four months before the suppurative stage is reached. Then follows deep ulceration, and finally cicatrization, leaving a disfiguring scar. The constitutional disturbance is not very marked, as the patient at no time has to give up work. The disease very slightly resembles the verugas, cases of which I have seen in Peru, but there are many distinctive features between the two diseases. A pupil of Hebra, from Vienna, studied the disease in Aleppo for six months, and he came to the conclusion that it was allied to syphilis in some way; but the syphilitic treatment has no effect in modifying the disease. The missionary physicians say that the disease lasts about a year, the inflammatory, the vesicular, pustular, and ulcerative stages coming in sequence, and that the best thing to do is to let it alone, as interference seems but to aggravate it and deepen the cicatrix.

The hospitals were visited in Smyrna and Venice, but nothing unusual impressed me in the general arrangement or care of the sick. While at Venice a relative of one of the officers attached to the ship visited the city and was attacked with diphtheria. The tonsils and pharynx were covered with membrane and the fever was high (104°). On the second day of the appearance of the membrane I injected 20 cubic centimeters Behring's No. 2 serum with very good effect, as the next day the temperature dropped to 101° and the membrane began to swell and soften and come away. The case made a rapid recovery. There were several cases of diphtheria among the tourists, contracted probably by exploring the narrow canals in the interior of the city where the water is shallow and sluggish, with very little action in carrying off the refuse.

There were no deaths on this vessel during the year, and no epidemic disease.

REPORT ON THE U. S. S. TEXAS.

By S. H. DICKSON, *Surgeon, United States Navy.*

The *Texas* was recommissioned at the navy-yard, Norfolk, Va., on July 20, 1896, and although she was not thoroughly completed and workmen still crowded her decks, her officers immediately took up their quarters on board, while the crew slept and messed on the U. S. R. S. *Franklin*, reporting for work every day, until August 5, when they were finally transferred. The *Texas* was attached to the North Atlantic Squadron, participating in the summer maneuvers with the fleet, and taking part in the landing and shore exercises at Fishers Island. The exhaustive general description of the ship contained in the report of my predecessor, Surg. Charles A. Siegfried, for 1895, leaves nothing to be said on that subject and confines this report mainly to the consideration of the many improvements made since then relating to her ventilation and hygiene, and to other matters affecting her sanitary condition and the health of her complement.

Two of the most important questions in the reconstruction of the *Texas* related to the reduction of the high temperatures in certain parts of the ship noted during her first commission, and the improvement in her ventilation, one depending very much upon the other. The experience of the commanding officer and the critical observation of the surgeon on her first cruise happily indicated the direction in which such changes should be made, and the result from the work done upon her at the Norfolk Navy-Yard, under the direction of the Navy Department, has been in a degree successful and gratifying in affording increased comfort and health.

The redoubts, engine and fire rooms, and the dynamo compartments suffered most from the excessive heat, although it was generously distributed to other parts of the ship. Decided amelioration was effected in these spaces, although I have not the data for comparison, yet the temperatures still remain, unfortunately, very high.

The battle plates in engine room, ventilating trunks, and skylights have been removed, thus giving clear outlets, through which a large volume of heated air escapes, and the ventilation itself has been changed. Hatches have been cut in the redoubts, releasing a great part of the hot air confined there; two ports have been cut to turrets, and a passage from redoubt chamber to forward deck made, which, besides affording an exit to hot air, facilitates removal of men wounded in action. The smokestack casing has been covered with nonconducting material, louvers introduced for hot-air escapes, additional electric fans have been installed, and ducts to ventilating fans remodeled. The hot air banks up in these confined spaces and can only escape through the door into the central passage. Abundant air is supplied by blowers. The length of the watches of men employed about the dynamos should, in my opinion, be shortened or the force increased. The work is very hard, requiring constant and close attention while running, and frequent repair and adjustment when shut down. Health suffers, as evidenced by lowered vitality, loss of flesh, and sallow complexion.

The mercury in the fire rooms frequently reaches a height of 135° F. when all the boilers are in use; in fact, it hardly ever falls below 125° F., and such a temperature long sustained can only be most prejudicial to the health of the men employed there. It is a matter of great surprise to me, from frequent personal observation, that human nature can stand it and that the firemen and coal passers do not break down more frequently. That they do suffer severely and are laying the seeds of future cardiac, cerebral, pulmonary, and hepatic troubles admits of no doubt, and the best prophylaxis, if the conditions must remain as they are, is to increase the force so that the intervals of rest shall be longer, and, if possible, shorten the hours of duty in addition.

The heart of a modern battle ship, the citadel of her strength, lies not only in her battery, of inestimable value as that is, but in her engines as well, and that fact demands the greatest consideration. It often happens that men from deck must be detailed as auxiliaries to the coal passers, but this extra help is not fitted for such work and soon breaks down. In enlisting for firemen and coal passers especial care should be exercised by medical officers to accept only those whose previous habits and good physical development particularly adapt them for this important and arduous duty.

It is doubtful if the crew of any of our ships of war are better berthed than that of the Texas or have more cubic air space per man. The numerous 14-inch ports admit abundance of light and air, and the ventilation is excellent through the many ducts leading from blowers which are constantly being run under a minimum speed of 500 revolutions per minute. The temperature of the berth and gun decks is moderate even when all the ports are closed.

The heat in the steering-engine and tiller and ice machine compartments is too great (110° F.) at sea, and there is insufficient outlet for it. This confined hot air heats the junior officers' quarters, which are right above, and causes much discomfort to the occupants.

In winter the quarters occupied by the marine guard, aft of the citadel on the gun deck, are very cold, and on one occasion ice formed in the scuttle butt. Additional steam coils are required for this entire half-deck, as well as for the wardroom, where two small radiators accomplish very little in keeping it comfortably warm in severe weather.

It is greatly to be deplored that no change was made in the location of the sick bay during the reconstruction of the *Texas*. It still occupies the same noisy and contracted space in the bows of the ship, where the pitching motion is most severely felt. It lies between the forward torpedo-tube compartment and the chain locker, and serves a better purpose as a passageway to the former and a storeroom for two torpedoes, which take up one side, than as a hospital for the sick, or a consulting room. But one cot can be swung in it with any degree of comfort to a patient, and, while the ventilation is good, the battle plates must frequently be shipped in the ports while at sea, thus excluding all natural light. There is hardly enough room in it to perform any surgical operation requiring anæsthesia. I recommend its removal to the space now occupied by the marine guard; but if this can not be done, and the bow torpedo tube can be given up, as seems probable, then that small compartment might be thrown into the sick bay, the torpedoes removed, and one permanent cot fixed on the starboard side. The sick are still permitted to hang their hammocks over the chain lockers in the compartment just abaft the sick bay, and although it is necessarily a noisy place, the additional room it gives is almost indispensable.

A locker for the proper preservation of the different surgical instruments and appliances has been made on board and placed in the bathroom. These, as well as the medicines and hospital stores, are of most excellent quality. Nothing has been done to improve the dispensary since the report of Surgeon Siegfried, although he submitted plans which, if carried out, would have been of great value in adding space, promoting order and cleanliness, and increasing the comfort of the apothecary.

The bathing facilities for the crew have been greatly enlarged, since the last commission of the *Texas*, by the construction of a room, bulkheaded off in a corner of the after compartment of the forward gun deck, containing six rain baths. The showers fall in small recesses shut off from each other by a half length of sheet iron, and give an abundant supply of water. The deck is neatly tiled, the drainage good, and abundant light and ventilation supplied by a 14-inch air port. It is always kept in excellent condition. It would be desirable, if practicable, to have the water warmed in very cold weather. A small compartment abaft the officers' quarters has been fitted up with one rain bath, fresh and salt water, for the use of the 14 wardroom officers. Although this is hardly adequate for such a number, it is much appreciated, and would be still more popular if the water could be warmed in winter. The room itself is bitterly cold at that season of the year, but it is too contracted in size to have a steam coil placed in it.

The wash room for the firemen and coal passers under the redoubt is one of the hottest parts of the ship, the temperature being, generally, while under steam, 110° F. The other objections to it mentioned in Dr. Siegfried's report are unchanged. It is difficult to keep it clean, as it drains very badly. It is in many respects repugnant.

The old evaporator has been replaced by two of large size, the former distillers remaining, and there has been no scarcity since of good potable water. The capacity of present plant is 6,000 gallons a day, and the tanks are capable of storing 6,400 gallons.

It is gratifying to report that an ice machine has been put in the ship, so that when needed in tropical climates sufficient quantities of ice can be supplied to the sick and also for cooling the water as it comes from the tanks. It would be better and more economical if refrigerating coils were adapted to the scuttle butts, thus keeping up an equable low temperature. The ice machine is the Allen Dense Air and has a nominal productive power of 1 ton a day.

A drying room on board of the *Texas* is a great desideratum, and it is rather singular that no space has been set aside for that special purpose. There are frequent, almost daily, occasions when it would be of decided value from a hygienic point of view.

On the morning of November 9, while the *Texas* was lying alongside the dock at the New York Navy-Yard, the accident to her sea valve occurred by which a large amount of water, mixed with bottom mud, was admitted to both engine and fire room compartments, and to many other parts of the ship, but not to the living spaces. In view of possible future danger of infection from any pathogenic germs in the mud and decomposing matter through which disease might develop under favorable atmospheric and climatic conditions, it was deemed prudent not only to secure cleanliness by mechanical means, but also to disinfect the parts of the ship that had been submerged. Such suggestions being referred to the commanding officer met with his approval and hearty cooperation. The machinery was flushed down from above by a powerful stream as the water was pumped out from below, and this was repeated again and again until all adhering matter was removed as far as possible. Subsequently the machinery was cleaned in detail by the engineer's force. All stores were removed from the flooded compartments and all ammunition from the wet magazines. These as well as any parts of the double bottoms or passages into which the muddy water had penetrated were first thoroughly flushed with fresh water and scrubbed with soap and water. A disinfecting solution was then freely applied to decks, bulkheads, ceilings, and into every accessible nook and cranny. The coal bunkers were closed and steam at 260 forced in them. A personal inspection of the double bottoms and compartments was afterwards made and they were found to be dry and clean.

The usual instruction in first aid has been regularly carried out by the medical officers. The petty officers and crew in parties of ten or fifteen are given practical instruction in the application of compresses, bandages, and tourniquets, how to carry wounded men, etc. It is gratifying to notice the interest taken in the instruction, and how much of it is retained.

The health of the ship has been good. No cases of contagious disease have occurred. The two cases of typhoid fever shown in the returns had their origin at the League Island Navy-Yard.

REPORT ON THE U. S. S. MARION.

By D. O. LEWIS, *Surgeon, United States Navy.*

The *Marion* left Callao, Peru, about February 19, proceeding to Valparaiso, Chile, stopping at Iquique, Caldera, Coquimbo, and finally reaching Talcahuano; from that place she proceeded under sail back to Paita, Peru, thence to Panama, and from there to Callao, where we arrived August 11, 1896. As there were still some cases of smallpox both in Callao and Lima, a fresh supply of vaccine virus was kindly furnished by Dr. J. M. Quiroga, who is in charge of the Extencion Vacinal at Lima. All men before going on liberty were thoroughly vaccinated, a large proportion of successes being the result.

While at Paita, Peru, I had an opportunity of visiting Puira, which is situated about 62 miles from Paita, with which it is connected by rail. Puira is very much esteemed as a health resort by the Peruvians, and although there is no sanitarium proper at this place, several of the families are in the habit of taking in boarders, to whom they administer the treatment, which consists of keeping the patient closely confined to the house for the first seven days, during which he is placed on a very spare diet of meat and rice, combined with large potations of sarsa. The effect of this is to induce a most active movement of all the emunctories—the skin, kidneys, and bowels. At the end of a week the patient is permitted to leave the house for an hour or so during the middle of the day, and a mixture known as the chica sarsa, a milder preparation than the sarsa, is now administered ad libitum and the patient is allowed to go about at will until the end of thirty or forty days, when the period of treatment usually terminates with a cure, or at least a great improvement.

So far as I can ascertain, sarsa is a decoction of various herbs, of which sarsaparilla is probably the basis or ruling ingredient, and the chica sarsa probably the same thing in a milder and more pleasant form, having for its excipient the chica of the country, a sort of partially fermented grape juice.

Rheumatics and syphilitics seem to derive the most benefit. Of course, as of all places of this kind, the most exaggerated stories of cures are told, which must be received with due allowance.

Those who are too poor to enter the private houses above alluded to for treatment, are said to derive considerable benefit by partially burying themselves in the hot sands.

The water supply of Paita is derived from the Chira River, and is brought by the railroad on tank cars from a pumping station about 23 miles from the town and stored in a large tank, from which it is retailed at the rate of about 1¼ cents per gallon, distributed to the customers by water carriers.

It is of good quality, containing considerable carbonate of lime and traces of nitrites, but little free ammonia. One other source of supply is now almost completed. It will consist of piping the Chira water to the mouth of the river, where it will be delivered in an 80-ton tank boat, which will be sailed to the town and delivered to carriers.

During the year the health of the crew has been excellent, no case of epidemic disease having occurred.

The bilges have been carefully cleansed every week, and after thorough flushing they have, as a rule, been disinfected with a strong solution of bichloride of mercury.

REPORT ON THE U. S. S. DETROIT.

By Howard E. Ames, *Surgeon, United States Navy.*

Further experience convinces me that the defects pointed out in my last report still exist and should be remedied.

The cleanliness of the ship is still maintained and her sanitary condition is as good as it is possible to make it under present circumstances. A number of observations were made with the anemometer on the ventilating system, but the results obtained were so unsatisfactory that it would be useless to record them beyond stating that they were so condemnatory as to demand a change in the lead of the air ducts and an increase in the power or capacity of the fans.

The fans act with only sufficient power to ventilate the sleeping quarters of the men, with the storerooms and officers' quarters cut off. I think this is largely due to the tortuous lead of the air ducts, their great length, and the great number of louvers. Two of the stationary deck ventilators (the two forward after ones) are useless appendages to the ship in their present state. They formerly were fresh-air inlets, for distributing the air through inlets in the floor of the berth deck and officers' rooms. For some reason they were closed (prior to my joining the ship). They now conduct air into a series of blind ducts. They might be made to discharge air into the berth deck or engine room with slight cost. If they are not to be utilized their removal would give more deck room and save the cost of paint and labor in keeping them clean.

The ventilation of the wardroom was much improved by keeping the poop-deck ventilators open, as they prevented the hot air from banking up overhead and added greatly to the comfort of the wardroom, both in cold and hot weather. I would recommend the addition of a revolving cowl to these ventilators, so they may be trimmed to act either as aspirators or perflators, as may be required. The wardroom, though finished in ash wood, is not well lighted. It was greatly improved by several coats of white paint, which added to its cheerfulness and the diffusion of light.

The officers' water-closets that I mentioned at length in my last report have grown worse through time, and only have been kept in fair condition through incessant repair and attention. The whole system should be renewed and modern closets supplied.

The side passages, with their iron decks directly over the boilers, radiate an immense amount of heat. The deck indicates a surface temperature of 140° F. If they were covered with nonconducting cement, and supplied with a light wooden top deck, it would relieve the forward berth deck of the hot air that escapes into that compartment when the passage doors are open, rendering that compartment uninhabitable in warm weather, or even cool weather at sea.

The past winter demonstrates that the situation of the bunks in the officers' rooms on the starboard side renders them so cold as to be dangerous to health. The rapid cooling of the air from the iron side of the ship causes a constant flow of cold air under the mattress and over the sleeper. It was only by lining the lockers with paper and placing a layer of paper on the bunk and under the mattress that the bed was comfortable. Either some good nonconductor should be used to line the side of the bunk extending below the line of the floor of the bunk or the bunk placed differently. This defect was only noticed the past winter, as it is the first cold weather the ship has experienced since she was commissioned.

New storm awnings should be fitted to the spar deck, and secured close to the rail with a curtain hanging at least 3 feet below the leach of the awning. This would enable a number of the crew to swing their hammocks on the spar deck even in cold and blustering weather, and give them a comfortable place to exercise and loiter when off watch, and prevent the crowding under the forecastle and below.

In cold weather, with properly fitted awnings, the heat from the fire rooms would temper the air and make it comfortable. With the present awnings this can not be done, as the space between the hammock rail and the awning jackstay is so great, and the absence of a curtain allows the wind to blow directly upon any one attempting to sleep on deck. In the summer the curtain could be furled close to the awning leach, with the awning secured above the rail. I have given this matter careful thought, and am convinced that the change would prove a great boon to the crew.

The washing facilities for the crew are still unsatisfactory, buckets being used, and often in the open air in cold weather, which is trying at times. A careful consideration of the subject leads me to advise a plan which I think will overcome these difficulties. If the entire deck of the forward compartment of the forecastle were covered with a cement to make a waterproof covering, and a series of perforated pipes carried overhead connected with the circulating water system of the ship to temper the water, we would have a needle, shower, or rain bath with a capacity for 30 or 40 men to wash at once. The time required would not exceed seven minutes, except in cases of coaling ship. The water would run off through the scuppers, the deck dried down, and its present use not interfered with.

An objection was suggested that the chains might injure the cement. This is easily overcome by a plank secured to the cement in the wake of the chains. The cost would be small, the difficulties few, the benefits great. A wash room was provided, and still exists in name. It was too small, and is now used as a storeroom for deck gear.

These few changes would add greatly to the health, comfort, and contentment of the crew, and thus to the efficiency of the ship.

REPORT ON THE U. S. S. DOLPHIN.

By Frank Anderson, *Surgeon, United States Navy.*

On January 2, 1896, the *Dolphin* arrived at Livingston, Guatemala, and was engaged in surveying in the Bay of Honduras from that date until early in March. During most of the time the vessel was anchored in the neighborhood of either Livingston or Puerto Barrios. The work upon which the officers and men were engaged was varied and arduous. Before commencing the actual work of survey some time was spent in work on shore, in putting up signal stations and laying out a base line. This involved considerable exposure, as the shore parties were obliged to spend a great part of the day in wading through swamps and in clearing a way through the jungle, exposed to the heat of a tropical sun. The men suffered considerably from sunburn, from minor lacerations of the feet and legs, and from the bites of insects, but no serious results followed in any case.

Puerto Barrios is a small station, the terminus of a railroad that is being constructed through to Guatemala City with the ultimate purpose of connecting the Atlantic and Pacific coasts. At present the town consists only of a few houses for officials and of the buildings belonging to the railroad and custom-house. A long line of shanties and huts, occupied by laborers and small storekeepers, extends from the town along the shore for a distance of about half a mile. Back of the settlement the ground is marshy and covered with thick tropical vegetation. The conditions, therefore, are not favorable to health. Malarial fever in a severe form prevails and almost everyone, sooner or later, contracts the disease if he remains throughout the year. Malarial hematuria is not uncommon among those who have suffered from two or three recurrences of malarial disease, and it is often fatal. Venereal affections of every variety are common.

A "tide-gauge" party, consisting of three men from the ship's company, was established on shore at Puerto Barrios and remained for thirty days. Through the courtesy of the railroad they were allowed to live in the sheds on the company's wharf. Healthy, temperate men were selected for this duty. Food and distilled water were furnished them from the ship and each man was required to take three grains of quinine every morning. The men remained perfectly healthy during their stay on shore and have continued so ever since.

There is a small hospital at Puerto Barrios, supported by the railroad company for the treatment of its sick or injured employees, and a good deal of successful surgical work is done at this institution. It can also afford accommodation to a few private patients.

Upon completion of the work in Honduras Bay the *Dolphin* proceeded to Puerto Cortez, Honduras, and a survey was made of that harbor. On March 17 the vessel sailed for home, stopping on the way at Tampico, Mexico, and Key West, and arrived at Norfolk on April 11. During the three months spent on this cruise the health of officers and men was good. The admissions to the sick list were for minor affections and injuries. There were but 5 admissions for malarial fever, and it is not certain that these patients had not previously suffered from the disease. Only 1 death occurred, and this was caused by cerebral hemorrhage.

During the summer the *Dolphin* was employed upon special service and visited various ports on the Atlantic coast between Gloucester, Mass., and the capes of the Chesapeake.

On November 1 the vessel returned to the Washington Navy-Yard and remained there at the end of the year. During the two months' stay at the yard the health of the crew has been excellent. No cases of malarial poisoning have developed.

I have but little to add in regard to the general sanitary condition and arrangements of the ship, as these have often been reported upon. The vessel is clean, dry, and well ventilated, and the accommodation for the crew is as good as could be expected in a vessel of this size. I would, however, call attention to the very limited facilities for the examination of the sick and of candidates for enlistment. There is no sick bay, and the sick when confined to their hammocks are billeted in the forward compartment of the berth deck. There is no place where a patient can be put in the reclining position for the purposes of examination or operation except upon a mess bench on the berth deck or on the deck itself. This precludes all possibility of the privacy and quiet which are often desirable and sometimes necessary. The dispensary at present is so small that there is only floor space enough for a camp stool. By extending it 4 or 5 feet, the dispensary could be made large enough to combine the purposes of examining and operating room, and this would not seriously encroach upon the space of the berth deck.

REPORT ON THE U. S. S. OREGON.

By P. A. Lovering, *Surgeon, United States Navy.*

The *Oregon* is classed as a coast-line battle ship; was built at the Union Iron Works, San Francisco, and was put in commission at that port for the first time on July 15, 1896. The hull is built of steel, and the ship has a displacement of 10,000 tons.

The complement of the vessel is:

Commanding officer	1
Wardroom officers	12
Junior officers	15
Warrant officers	3
Deck force, including servants	278
Engineer's force	99
Marines	60
Total	468

The battle ship differs so radically from the old men-of-war and also from the modern cruisers that even the time-honored names of the different parts of the ship have of necessity been given up. It forms a type by itself, and it is difficult to compare it with any style of vessel. In a very general way the *Oregon* suggests a monitor with high free board, having a turret forward and a similar one aft connected by a superstructure.

MAIN DECK.

The main deck corresponds to what is usually called the spar deck, but is uncovered only at the forward and after ends of the vessel outside of the two turrets. Between the two turrets there is a large amidships section, covered by the superstructure deck, which is about 125 feet long. This covered section of the main deck is often called the gun deck and, although the name is not strictly correct, as it is a convenient one I shall make use of it hereafter.

On the gun deck are the offices for the executive officer and navigator, the armories, the water-closets for the wardroom and junior officers, the distilling room, and those for the ice machine and for refrigerating. These various rooms occupy the two extremities of the gun deck, and are separated from the main part of it by transverse bulkheads running the whole breadth of the ship.

The main central section of the gun deck affords berthing space for nearly 100 of the crew. It is well lighted and ventilated by natural means and at the same time protected from the weather. It is decidedly the best of all the living spaces of the ship. The galley is placed here, but as the ventilation is so excellent there is but little annoyance from heat or the odors of cooking caused by its presence.

BERTH DECK.

The berth deck is immediately below the main deck and entirely above water. It may be regarded as divided into three great sections—after, forward, and midships or citadel. These sections in turn are subdivided into smaller water-tight compartments.

AFTER SECTION OF BERTH DECK.

All this part of the berth deck, except a torpedo room at the stern, is occupied by quarters for the officers.

Cabin.—The captain's quarters comprise a main cabin, two staterooms, and two bathrooms. They are conveniently arranged, well furnished, and neatly finished in hard wood.

Officers' staterooms.—Directly forward of the cabin is the office and pantry for the use of the commanding officer, and also 16 rooms for the wardroom and junior officers. Owing to the great beam of the ship, in addition to the 12 rooms which are placed outboard in the usual place, there are 6 inside rooms, 3 starboard and 3 port, opening into the passageway which lies between them and the outside rooms. The outer rooms do not differ materially in shape or general arrangement from those usually found on men-of-war. They are of good size, and have rather more than the usual cubic air space, owing to the greater height between decks, which is 8 feet. Light and air are admitted through air ports, which are a trifle over 12 inches in the clear. In pleasant weather the rooms which are on the sunny side of the ship are fairly well lighted, and those on the shady side indifferently. In overcast or bad weather all the rooms are dark and artificial light is necessary. The natural ventilation through the hatches and air ports is sufficient in good weather, although at times it is rather drafty. When the hatch hoods have to be used in bad weather the air is soon vitiated.

The 6 inside rooms obtain their light and air through small hatches in the main deck. In port, when the weather permits the hatches to be kept open, these rooms are fairly lighted and well ventilated. At sea, when the hatches are on, they are dark and constantly require artificial light and ventilation. In port, too, when the awnings are spread the light is poor.

Officers' mess rooms.—Forward of the staterooms just described, and abreast the afterturret, are 2 mess rooms, 1 for the wardroom officers on the starboard side, and that for the junior officers on the port side.

Wardroom officers' mess room.—This takes the place of the wardroom country of the older vessels, but differs from it in several respects. It is quite distinct from the staterooms, as it is in a separate compartment and placed outboard between the turret and the ship's side. It is most irregular in shape, being encroached upon in its width by the curving turret and coming to a point at its forward end. The length varies from 25 to 37 feet and the width from 12 to 17 feet. From the irregular form a considerable part of the wardroom is of little use, and there is really less available space than where the area of the floor is smaller. The width, which is not excessive, has been diminished in its narrowest section by a permanent transom and sideboards, leaving a very narrow passage around the mess table.

Junior officers' mess room.—The steerage occupies a space on the port side of the ship corresponding to that of the wardroom on the starboard side, but is considerably smaller, although the number of occupants is greater. Its shape and dimensions are irregular, the length varying from 12 to 24 feet and the breadth from 12 to 16 feet. From its irregular shape much of the space can not be well utilized, and it possesses in an increased degree all the inconveniences of the wardroom, being over 10 feet shorter and having 3 more occupants. It is also used at night by two of the officers as a sleeping room.

Both the mess rooms are fairly well lighted by air ports and hatches, and in warm, pleasant weather the natural ventilation is good, and there is a free circulation of air through the passages into which they open at each end. When the weather is at all cool this circulation of air becomes altogether too strong for comfort and health, so that the doors and hatches have to be closed. The air then quickly becomes stagnant and vitiated. The artificial ventilation and the electric lighting is good.

Furniture and fittings of the officers' quarters.—The cabins, mess rooms, and staterooms have excellent furniture, made of primavera, a light-colored wood from Mexico, not unlike maple in appearance. Besides the usual furniture each room has a folding wash basin, with an ever-ready supply of fresh water from the faucet above. This is a new feature to me on a man-of-war and a source of much comfort.

Not only in the officers' quarters but through all the ship one is struck with the comparative absence of wood. The use of it has been reduced to a minimum, and its place taken by iron. This disuse of wood is due to the disastrous results from splintering, and above all from fire, which has occurred in recent war.

In the *Oregon* all the covered decks, bulkheads, and partitions are of iron. There is no inner sheathing or ceiling of wood, and even many of the doors are of metal. The iron bulkheads and the inner skin of the ship, the beams and stanchions, in fact almost all of the exposed iron of the ship, are covered with cork paint to prevent the condensation which is so apt to occur upon a metallic surface which is coated with ordinary paint. In most parts of the ship the cork paint seems to work well, but in the extreme forward and after compartments, as well as in some of the storerooms, there is in cold, damp weather a considerable condensation of moisture, sufficient in some cases to form an appreciable amount of water on the deck where it falls.

The iron decks all through the ship are covered with linoleum, which is painted and shellacked. It appears to be well adapted for a deck covering, as it is pleasant to walk on, easily cleaned, and nonabsorbent.

While it does not look so well as the old wooden decks, it is much drier and free from dampness.

CITADEL OR MIDSHIP SECTION OF BERTH DECK.

Directly forward of the officers' quarters comes the midship section of the berth deck, usually called the citadel, as it lies entirely inside the armor of the ship. It is about 120 feet long and 48 feet wide, filling the longitudinal space between the two turrets and protected on the sides both by the armor and in the greater part of its length by coal bunkers nearly 8 feet wide. It is subdivided by transverse bulkheads into three water-tight compartments, a large central one and two smaller terminal rooms. The citadel is much encroached upon by hatches for the engine room and the two funnels, by the auxiliary fire room, and by numerous shafts for the ventilation of the fire room and the passage of ammunition. In it are situated the pantries and lavatories for the wardroom and junior officers, staterooms for junior and warrant officers, mess rooms for warrant and appointed officers, firemen's wash rooms, paymaster's office, carpenter and ordnance workshops, and the two prisons. After this general sketch of the citadel follows a more complete description of some of its details.

After section of citadel.—In the extreme after part of the compartment are the 2 pantries for the officers' messes. They are small, and fairly illuminated by deck lights, but the natural ventilation is poor, so that it is difficult to keep them sweet and clean. On the starboard side of the compartment is a torpedo with the necessary appliances, while the corresponding space on the port side has been taken for a room for two junior officers. The natural light and ventilation of this room is indifferent, but the cubic air space is larger. Passing along forward, the next places of interest are the 2 lavatories for the officers, which will be described later when the bathing facilities of the ship are considered. In the open space between the pantries and lavatories are berthed the mess attendants. There are 2 hatches in this compartment communicating with the gun deck, which furnish a good supply of air and considerable light.

Midship section of citadel.—This large compartment, occupying the middle part of the ship, is about 60 feet long and 48 feet wide, but its actual area is very much less by reason of the numerous inclosed hatches and shafts passing through it. Along the sides are built 2 rooms for junior officers and 3 for the warrant officers. These rooms are of good size, but, from their position inside the coal bunkers, can have no air ports, and are without either natural light or ventilation. These rooms are poorly adapted for living purposes, and in warm weather and when the ship is under way are very warm and uncomfortable. In a vessel of this type such rooms are perhaps unavoidable, but their existence is none the less to be regretted. Forward of these living rooms are 2 mess rooms for the warrant and appointed officers and the paymaster's office. These rooms are of good size and comfortably furnished, but have the same lack of air and light as the staterooms. Here, too, are the wash rooms for the firemen, which will be described under another head. The rooms just spoken of occupy about 8 feet on each side of the compartment, and the area, as already stated, is still further diminished by numerous shafts and hatches and the auxiliary fire room. In the space left clear are berthed a part of the marine guard.

Forward section of citadel.—The forward compartment of the citadel, if clear, would form a large room, but in it are placed the forward smokestack, 2 coal bunkers, the carpenter shop, the ordnance workshop, 2 prisons, 2 torpedoes with all their equipments, and a large ventilating shaft. It is fairly lighted by 8 deck lights, but the ventilation is poor, as there is no direct communication with the outer air. In this section of the citadel are berthed those of the marine guard not accommodated in the midships section.

Lighting and ventilation of the citadel.—The natural supply of air and light to this part of the berth deck is poor as a whole. The after compartment is the best supplied, as it has 2 hatches leading to the gun deck, which afford a fair amount of light and air.

The large central compartment of the citadel is sadly lacking in these important sanitary features. It has no direct communication with the outer air. A very scanty supply of light filters through a few deck lights from the gun deck, and 2 small hatches admit a meager amount of air. Artificial light has to be constantly used, and ventilation by the blowers is always needed. This part of the berth deck is also very warm, as it is over the main boilers and in it is placed the auxiliary fire room. When the vessel is under way the temperature often rises to 100° F. and even higher, and rarely falls below 85°. The forward compartment of the citadel is fairly lighted by 12 deck lights, but has no direct air supply. It is much cooler than the central compartment, as it is forward of the boilers.

In this compartment are the 2 prisons, which are rather larger than those generally found on men-of-war. The natural ventilation is in the usual manner through circular holes in the iron door, and each brig has an air duct opening into it.

BERTH DECK, FORWARD SECTION.

This part of the berth deck includes all the space between the citadel and the bow, but, like the rest of the ship, is subdivided by watertight bulkheads into smaller compartments. The main after part of this section quite closely resembles the berth deck of an ordinary cruiser despite the fact that it is irregular and peculiar in shape. At the side of the ship it is 70 feet long, while in the median line this dimension is reduced by the turret to 28 feet. It is fairly lighted and ventilated by a hatch and 16 air ports, which all have to be closed at sea. The extreme forward part of the berth deck, occupying the bows of the ship, contains, besides berthing quarters for the crew, the forward torpedo room, sick bay and dispensary, and the water-closets for the men. It is quite well lighted and ventilated, having, besides the air ports and deck lights, a hatch and ventilators from the main deck.

The whole forward section of the berth deck is cool and comfortable, even when the ship is under way, as it lies entirely forward of the fire rooms. It has, however, the disadvantage of being the dampest part of the ship. In cool weather there is marked condensation upon the skin of the ship extending aft for about 50 feet from the stem. The cork paint appears in this place to be of little use, and the moisture collects to such an extent as to form small pools of water on the deck below. When the steam heat is turned on, this condition is entirely remedied.

Between 50 and 60 of the crew are not berthed either on the main or berth decks, but sleep elsewhere in the turrets and adjacent passages and in the tiller room. Forty are accommodated in the turrets and the neighboring ammunition passages. The cubic air space is large and the place well ventilated through the turrets. About 15 sleep in the tiller room. The air space is sufficient and there is good ventilation by the blowers, but the place is cool and damp from the condensation of moisture upon the skin of the ship.

MEDICAL DEPARTMENT.

Sick bay.—The sick bay is placed in a water-tight compartment in the forward part of the ship on the port side. The forward end is cut off by a partition which does not quite reach the deck overhead, and is fitted as a bathroom, containing a tub, water-closet, and stationary basin amply supplied with water.

The air space is about 1,750 cubic feet, and the provisions for lighting and ventilation are good. Natural light is obtained from two air ports and three deck lights, while two large ventilators supply an ample amount of air. It also has air ducts and electric lights to supplement the natural means of lighting and ventilation. Hooks are provided to berth 16 men, but one-half that number are all that can be comfortably accommodated. A transom upholstered in leather affords a comfortable bed for a sick man. The furniture is good and convenient, comprising an operating table, a commodious office table for the officer holding sick call, and 2 large lockers. As in all the compartments in the forward part of the ship there is a marked condensation of moisture upon the ship's side in cool weather, which the cork paint does not prevent. On two occasions sufficient water has dropped upon the transom to make it unfit for use, and the cushion has had to be removed to prevent it being spoiled. The doors in the lockers have swollen so much from the great dampness that they could not be closed. When steam is turned on the heaters this dampness is prevented.

While the sick bay is not in the extreme bow of the ship, it is so far forward as to possess practically the same discomforts. The motion is great, and when going at full speed or breasting even a moderate head sea many tons of water are dashed upon the deck overhead. It is unfortunate that in our ships the sick bays are so generally placed in the part of the vessel which is least fitted for that purpose.

Dispensary.—The dispensary is directly outside the sick bay, although it does not communicate with it. It is of good size, having about 250 cubic feet of air space after making the usual deduction for fittings. It is provided with an air port, and has also artifical ventilation, electric light, and a steam coil. In addition to the usual dispensing counter, drawers, and lockers, there is a stationary basin, with a supply of fresh water.

Storeroom.—The storeroom is on the orlop deck, not far from the dispensary; is unusually large and is well provided with shelves and lockers. It is free from any moisture and is well adapted for the storage and preservation of the medical stores.

The outfit, both of medicines and instruments, is abundant and excellent in all respects.

SPECIAL PROVISIONS FOR TIME OF ACTION.

The sick bay is situated in one of the most exposed and vulnerable parts of the ship, which forbids its use in time of action, and consequently another station has been assigned to the surgeon. The temporary hospital is within the citadel, on the port side, just forward the junior officers' mess room. While not very spacious, it is the best situation available and possesses the advantage of being near two of the hatches leading to the main deck. It is also close to the lavatory with its supply of water. The means for conveying the wounded to this temporary hospital are not satisfactory and the deficiencies are to a great extent unavoidable. There are only 4 hatches leading from the main deck to the citadel, and they are too small to permit the passage of the cots and slings generally employed on a cruiser. The dimensions of these hatches are only 5 by 3 feet. The only devices for lowering the wounded which have so far been found practicable are either a chair rigged for that purpose or the ambulance lift designed by Dr. J. D. McDonald, of the English navy. This consists of an ordinary hammock attached by the head and foot clews to a pole 4½ feet long, and also sustained by a lanyard fixed to a ham piece. Even in the quiet of peace, when no confusion prevails, I have found the transportation of the injured to the sick bay quite difficult, owing to the narrow doors and passages and the many shafts which have to be avoided and which necesitate abrupt turns.

VENTILATION.

In addition to the natural ventilation by air ports and ventilators which are described in the sketch of the various parts of the vessel, a complete and satisfactory system of artificial ventilation has been provided. It consists of 4 centrifugal blowers, 60 inches in diameter, of a pattern designed by the Union Iron Works, which by means of reversible valves in the air shafts can be used either for supplying air or for exhausting. The area of the induction nozzle is 14 by 36 inches, or 4.98 square feet, and the area of the discharge nozzle is 30 by 12 inches, or 2.5 square feet. They are designed to run at the rate of 400 revolutions, and to supply 8,000 cubic feet per minute.

The air ducts lead to all rooms and compartments below the gun deck, have bell-mouthed openings covered with wire gauze, and registers with openings equal to twice the area of the pipes. The louvers or orifices of the ducts have been so placed in the different rooms and compartments that they are opposite the doors and hatches, thus insuring a good circulation of air. This is a much better plan than having the louvers and the ordinary openings of the rooms close together, as is often the case. When the hatches have been battened down on several occasions, and the natural ventilation of the berth deck almost entirely cut off, the air has been kept good by the blowers. In practice it has been found that the best results have been obtained by exhausting the air in one part of the berth deck and forcing it into another. For ventilating the dynamo room there are two stationary fans arranged for forcing in air. Each fan is driven by an electro motor at a speed of 1,570 revolutions, and has a capacity of 2,200 cubic feet of air a minute. For exhausting the air from the double bottoms there are 4 portable fans, each driven by an electro motor. For ventilating each fire room and engine room there is a centrifugal blower similar to those used for the ventilation of the ship, but entirely distinct.

So far the system of artificial ventilation has worked satisfactorily, and it appears to be well planned and complete in its details.

LIGHTING.

There are 3 generators, which supply not only light, but also drive 10 motors. Each generator has at 400 revolutions an output of 300 amperes at 80 volts. One dynamo is constantly in operation, and a second is added when necessary. There are over 600 lights in the ship, not including the search lights. Very many of these lights, as in the magazines and bunkers, are only used occasionally, but many are in constant use day and night. They are well distributed throughout the ship, and the result is on the whole satisfactory. It is a difficult problem to successfully light a ship which is divided into so many compartments, and where the clear space is encroached upon by almost countless shafts, pipes, and ducts which intercept the rays of light. While some parts of the ship are not very well illuminated, I think that as a whole the lighting system is good and very much superior to any employed in the older vessels before the days of electric lighting.

HEATING.

The ship is warmed by steam, and the coils are well placed and sufficient in number. There is very little of the thumping sound which is so often heard and is so annoying.

DISTILLING APPARATUS AND WATER SUPPLY.

Fresh water is supplied by two Baird evaporators, with a capacity of 5,000 gallons a day. This capacity is only reached when the evaporators are clean, but in a few days scale accumulates to such an extent that the quantity produced is reduced to about 3,500 gallons. This is quite insufficient to supply the water required by the crew and to replace that lost in the boilers. An additional evaporator has been ordered by the Department. The water supplied contains a decided trace of salt, but not enough to make it unfit for use. The tanks contain 18,000 gallons, and the consumption in port is between 3,000 and 3,500 a day, or between 7 and 8 gallons for each individual on the ship. At sea this amount would have to be materially reduced. The trimming tanks hold 64,000 gallons of water, and as they are filled when the vessel goes to sea, the supply is increased to over 80,000 gallons. Water is taken regularly from shore, as its cost is much less than that of the distilled. It is the water supplied to San Francisco, by the Spring Valley Water Company, and appears to be of good quality. Intestinal affections have been almost unknown on the ship, and the few trifling cases of diarrhœa probably had no connection with the water.

REFRIGERATING PLANT.

The refrigerating room has a capacity of about 550 cubic feet, and is placed on the starboard side of the main deck forward. The room for the ice machine occupies the corresponding place on the port side, and contains a 1-ton Allen dense-air machine. This is said to have sufficient capacity to make 200 pounds of ice per day, to cool 300 gallons of water to about 40° F., and to keep the temperature of the refrigerating room at about 32°. It has been worked but once since the vessel was put in commission, and then no ice was made, but the refrigerating room was kept cool enough to preserve its contents.

On the trial trip ice was made at the rate of 600 pounds a day, and the refrigerating room was also kept at an average temperature of 35° F.

BATH AND WASH ROOMS.

For the deck force there are practically no bathing facilities provided. A small room forward was originally fitted with basins for their use, but all except 3 have been removed and the space thus obtained utilized for additional water-closets. Three wash basins for 300 men is certainly a meager provision.

The engineer force have 2 good-sized wash rooms in the citadel section of the berth deck, easily accessible from the fire rooms, and fitted with 11 basins and 2 douches, which are provided with fresh water. The floors are tiled and the rooms are kept in good order, considering that nearly 100 men wash and change their clothing in them.

In the after part of the citadel, on the berth deck, are the 2 lavatories for the wardroom and junior officers. They are large, well arranged, and, having tiled floors, are easily kept clean and sweet. Each lavatory contains 2 bathrooms and an outer room fitted with 3 basins. The bathroom contains a zinc-lined bath tub, which is raised nearly a foot above the deck, thus avoiding any collection of dirt and moisture under it. There is an ample supply of water, both fresh and salt, which can be quickly heated by steam. Each tub is also fitted with a douche. The whole arrangement and all the fittings of the lavatories are most excellent.

For the captain's use there are provided 2 large bathrooms, each well fitted with a tub, water-closet, and bowl. In the forward end of the sick bay, and separated from it by a partition which does not quite reach the deck above, is a bathroom, furnished with a water-closet, tub, and basin. It is conveniently arranged and well ventilated by a large chute from the main deck above.

The bathing facilities provided for the officers and engineer force are good and sufficient, and it is to be regretted that practically no provision has been made for the deck force and marines. I am well aware that it would be difficult to obtain sufficient space for such lavatories, and that the amount of water which would be required could not be supplied at sea.

WATER-CLOSETS.

The water-closets throughout the ship are of the same pattern and differ very little whether situated forward or aft. They have no traps or other complicated appliances, which are so apt to become foul and get out of order, and are constantly flushed by sea water from tanks on the superstructure.

Large and well-equipped water-closets in the after portion of the main deck, well lighted and ventilated by air ports, are provided for wardroom and junior officers. The floors are tiled and easily kept clean. The compartment assigned for this purpose is divided into 5 smaller rooms, 4 containing closets, and 1 having 2 urinals. They are unusually free from odor.

The water-closets for the crew are placed in 3 small compartments in the forward part of the berth deck. Each of these compartments has, in addition to its connection with the ventilating system, an air port and a large ventilator leading from the main deck, thus insuring light and a good circulation of air. The floors are tiled and easily kept clean, and there is no absorbent surface at all except the wooden seats. The closets proper are of a simple and excellent pattern; a metal trough constantly flushed with running water receives the alvine discharges. Besides the closets there are 6 porcelain urinals, which, in spite of all the care given them and constant flushing, occasionally give out an ammoniacal odor. It is suggested that a plain metal trough with a good sized stream of water running through it would be better than the more elaborate urinal. Considering that the closets are used by over 400 men, they cause very little annoyance indeed on account of odors.

ENGINE AND FIRE ROOMS.

Each engine room has, besides the usual hatch, a blower for artificial ventilation. The temperature ranges between 90° and 100° F. when under way.

Each of the 8 fire rooms has a large ventilator and also a blower for forced draft, which is used for ventilation. When under way the temperature has reached 135° F., but is usually 5° to 10° lower. This temperature was in cool weather, when the outside air was 60° or less, and it is quite probable that in warmer weather the fire rooms will be much hotter.

There have been no cases of prostration from heat.

DOUBLE BOTTOMS AND BILGES.

The double bottoms are inspected weekly, and are kept clean and dry. The bilges are pumped out weekly, and are clean and free from odor. The difference in their condition from that on the old wooden ships is most marked, and a degree of cleanliness and dryness is maintained which but a few years ago would have been thought impossible.

PRISONS.

The two prisons are in the forward part of the citadel and are unusually large, having an air space of nearly 350 cubic feet. They are ventilated by the usual circular holes in the iron doors, and each has a separate air supply from the blowers.

COOKING FACILITIES AND FOOD.

The galley is placed on the main deck and inclosed by coarse wire netting, which shuts it off from intruders, but permits a good circulation of air. It is subdivided into 2 rooms, the larger for the use of the crew and the smaller for the officers' messes.

The room for the crew contains a large hotel range, boilers, table, and an ample supply of fresh water. The range is an excellent one and sufficiently large to allow 16 of the 22 messes to have roast meat at the same time. The boilers are heated by steam and work very well, as the vegetables and other food cooked in them are not sodden by water. The officers' galley has a smaller range, and is well provided with the necessary tables and lockers.

The food supplied by the contractor is of good quality, and is supplemented with extra articles bought by the voluntary contributions of the men and by the money from the commuted rations, about one-fourth of the whole number. As most of the ordinary articles of food are obtained on this coast at a reasonable price, the men have a more varied and abundant dietary than usual. From frequent observation it appears that the cooking is rather above the average, and certainly the mess tables are well furnished with good food.

Each mess has the usual furniture and outfit now generally provided, such as swinging tables, folding benches, chest, lockers, and agate tableware. The master at arms and other chief petty officers have a mess room for their sole use. It is well and conveniently fitted up, having a stationary table, lockers, shelves, refrigerators, and sink.

AIR SPACE.

The initial cubic air space of the living quarters is shown in the following table:

Space.	Occupants.	Air space.	Average per occupant.
Cabin	1	3,600	3,600
Wardroom staterooms	12	4,550	379
Wardroom country	12	3,000	250
Junior officers' rooms	12	2,600	215
Junior officers' mess room	14	2,200	156
Junior officers' mess room, used also as sleeping room by two officers	2	2,200	1,100
Warrant officers' rooms	3	900	300
Warrant officers' mess room	3	700	233
Gun deck	90	18,000	200
Berth deck	293	50,000	170
Ammunition passages	32	7,000	218
Tiller room	17	3,500	200
After torpedo room	5	900	180

THE HEALTH OF THE SHIP.

The *Oregon* was placed in commission on July 15, and consequently this report covers a period of one hundred and seventy days or less than half a year. Practically the whole time has been spent at San Francisco, as the vessel has only been six days at sea, four days at Santa Cruz and Monterey, and twenty-two days at Sausalito. This last place is a suburb of the city and is only 5 miles distant from it.

The climatic conditions of San Francisco are remarkably uniform, and the temperature varies but little summer and winter, being about 62° F. in August and 52° in December. The climate has been characterized as chilly and dry in summer and chilly and damp in winter, but like so many other general expressions this is only partially true. Except for a few hours in the middle of the day the air is always chilly, and there is rarely a night when the atmosphere is not very damp. During the time the ship has been in San Francisco the dry and wet bulb thermometers have differed but a degree or two for most of the twenty-four hours, and very often have been the same. In the summer and early autumn there is a large amount of fog, which rolls in from the sea about the middle of the afternoon and persists until 9 or 10 o'clock the next morning. During the colder season there are many fine, clear days in the intervals between the rains.

Naturally, cartarrhal complaints of the respiratory tract are very common in such a moist climate. The stranger from the East has to become acclimated, and finds that he must wear here, in the comparatively mild weather even, the thickest of underwear. These complaints, although common and persistent, are not severe, and the more serious affections of the lungs, as pneumonia, are, judging from the few cases I have seen, quite mild. The city has been free from any epidemic during the last few months, although at the present time there are some cases of diphtheria.

The following table, arranged according to the classes in the statistical report, shows at a glance the diseases which have prevailed on the ship since she went into commission:

Diseases.	Cases admitted.	Discharged.		Remaining at end of year.	Sick days.
		To duty.	To hospital.		
Parasites and parasitic diseases	3	3			4
General infectious diseases	16	13	2	1	140
Constitutional disorders of nutrition	1	1			2
Diseases of the nervous system	14	13	1		49
Diseases of the visual apparatus	3	3			65
Diseases of the olfactory apparatus	4	4			15
Diseases of the digestive apparatus	22	20	2		115
Diseases of the respiratory apparatus	58	52	5	1	493
Diseases of the motor apparatus	9	6	2	1	54
Diseases of the cutaneous apparatus	7	6	1		17
Venereal diseases	10	10			88
Injuries	32	29	3		167
Poisons	3	3			13
Total	182	163	16	3	1,222

Nearly one-third of all the cases admitted and 40 per cent of the sick days were due to affections of the respiratory apparatus, mainly acute bronchitis and bronchial catarrh. The majority of the cases occurred among the younger men of the crew who had never lived aboard ship before, were careless about their clothing, and did not know how to take care of themselves properly. The very damp weather which prevailed.during August and early September, when these diseases were most rife, was probably also an important factor in their causation.

The class of diseases giving the next largest number of admissions and sick days have been the injuries, with 32 admissions and 167 sick days. Among these the most severe cases have been 3 fractures. Two, one a fracture of the patella and one of the humerus, were caused by slipping on a ladder, and presented no unusual features.

The third was a probable fracture of the base of the skull, caused by a blow on the left side of the head and immediately followed by unconsciousness, bleeding from the right ear and nostrils, with hæmatemesis. There was no fracture at the seat of the blow, as was verified later by an exploratory incision. Within a few hours the patient was sent to a civil hospital and later transferred to the Mare Island Hospital. For two weeks the symptoms arising from traumatic inflammation of the brain were very severe. The man was delirious and very violent, requiring constant mechanical restraint, and his recovery was thought impossible. Gradually this state of excitement subsided, leaving the man with considerable mental weakness and left facial paralysis.

Very few cases of venereal disease have appeared, and they have been mostly gonorrhœa and their complications. There have been but 3 venereal sores, all chancroids, and only one of any severity. No case of primary syphilis has been observed.

The few cases of venereal disease admitted to the sick list, and the comparatively small number of sick days from this cause, is quite unusual, considering the size of the crew and the large amount of liberty they have enjoyed.

The remaining diseases which have occurred presented nothing unusual either in number or the symptoms they have shown. Aside from the bronchial affections there have been few cases which could be ascribed to unfavorable climatic conditions or to ship life.

There have been 140 men examined for enlistment, with 79 accepted and 61 rejected. Three of the rejections were for color-blindness.

There have been 69 men vaccinated, and in 11 a satisfactory result was obtained, or a percentage of 15.9.

REPORT ON THE U. S. S. TERROR.

By W. R. DU BOSE, *Surgeon, United States Navy.*

The U. S. S. *Terror* was put in commission at New York on April 15, 1896, and, with the exception of two periods of about ten days each, when engaged in experimental trials in the vicinity of Sandy Hook, New Jersey, has remained at the navy-yard, New York. In type this vessel is a low free-board, double-turret monitor. The crew numbers 151 men, and there are 14 officers. The general climatic conditions influencing the health of the ship's company have been such as pertain to New York City, and being fully known furnish no occasion for comment in this report. During this period of eight and a half months the health of the crew has been satisfactory.

The medical returns shows a low rate of sickness, the total sick days being 522. Sixteen men were transferred to hospital with diseases and injuries, as follows: Gonorrhœa, 1; syphilis, 1; chronic rheumatism, 2; chronic phthisis, 1; pneumonia, 1; bronchial cartarrh and senility, 1; measles, 4; mumps, 2; fracture, 2. The extension of measles and mumps was checked speedily by prompt recognition of disease and immediate transfer to hospital.

GENERAL DESCRIPTION.

The *Terror* has a superstructure between the 2 turrets. The low free board of 2½ feet allows the sea to wash freely over the forecastle and quarter decks when under way at sea, and necessitates the closing of all hatches outside the superstructure. She is therefore a wet sea boat, and while cruising her crew would be exposed in an unusual degree to wet and chilly conditions, which, with enforced confinement to superstructure, would deleteriously influence health. It is worthy of mention that the mechanism for operating the 2 turrets and for steering depends upon power secured by compression of air, which is accomplished by 2 powerful compressors, 1 located on the berth deck and the other below, just forward of the fire room. The berth-deck compressor occupies most of the starboard side of the after-turret compartment, reduces the berthing space, and when in operation causes a decided increase of temperature, both here and in adjacent wardroom. The forward compressor is crowded into a dark, contracted space, and although 2 small blowers are specially provided to effect ventilation therein the leakage of steam from defective joints, the heat from fire room, the humidity and lifeless air make conditions of service in this space unbearable except for very short periods. Fortunately the presence of a mechanic during the working of the machine is not constantly demanded.

BERTHING AND CUBIC AIR SPACE.

The captain's cabin is located in the after part of the berth deck just forward of the tiller room, and has just forward of it a passageway and hatch opening to the deck above. Into this passage opens the cabin pantry, and, opposite, the room of the chief engineer. A door leads forward to the wardroom. The wardroom country has a companion ladder and hatch at its forward end, and has opening into it nine staterooms. The stateroom of the junior officer is a very small apartment in the after end of the superstructure. The staterooms of the two warrant officers are on the port side of the after turret comparment. The crew are berthed in the crew spaces of the berth deck, in the starboard side of forward turret compartment, and in the superstructure. Additional berthing space is utilized in the after turret compartment, in wing passages, and elsewhere. The hawse pipes lead into the forward crew space; a hatch opens on the deck above from the after crew space, and two narrow passages lead, one at each end, to the superstructure above. Through these openings a little aid to ventilation is secured in moderate temperatures.

The following table gives the air space and number of occupants in the various spaces:

Quarters.	Number of occupants.	Total air space.	Average air space per occupant.
		Cubic feet.	*Cubic feet.*
Cabin	1	2,600	2,600
Wardroom staterooms	10	4,275	427.5
Wardroom country	11	3,069	279
Junior wardroom officer's room (in superstructure)	1	167	167
Warrant officers' staterooms	2	624	312
Berth deck	61	11,516	188
Superstructure	57	11,712	205.5
Other berthing spaces	30	7,242	241

THE SUPERSTRUCTURE.

The water-closets for the crew are in the extreme forward end, and are 9 in number. A transverse passage, opening onto the main deck by a door at each end, separates them from spaces containing the galley and the lavatory and closets for officers. A passage leads from this into the "mess hall," which includes a large portion of the superstructure. Abaft this mess hall are the paymayster's office, armory, sick bay, and dispensary, warrant officers' mess room, captain's and executive officer's offices, and a small stateroom. Two hatches allow access to the deck overhead, and passageways correspond with those forward. The mess hall is also a berthing space; it is furnished with wire lockers, mess tables, and benches. The crew's library is placed here. The lighting is insufficient, but it is the intention to add additional lamps, and, this done, an admirable apartment will be provided. The galley smokepipe is led into the main smokepipe, which passes upward through this space, and it is to be expected, from this condition, that in hot weather the mess hall will be too hot for comfort. The ship has been only in the latitude of New York City, and exactly what temperatures will be experienced, with fires under all boilers, in warmer latitudes, remains to be determined. During the past summer a temperature of 110° F. was noted in this space. The ventilation of the superstructure is effected by natural means, through doorways, hatches, deadlights, and deck ventilators, aided by several electric fans. It is likely that the occupants of this living space will find it necessary to obtain relief from the debilitating heat in warm seasons by temporary accommodations under awnings on the upper deck. Such was the practice last summer.[1]

The other subdivisions in the superstructure are liable to uncomfortable heating in a less degree, but this has not, so far, been unbearable, and all feasible provision to secure livable conditions seems to have been made.

VENTILATION.

The system of ventilation is made up of four different parts, as follows:

1. The main system for the hold, with its storerooms and magazines; the living spaces on the berth deck, and for forced draft in the fire room.
2. The engine-room system, for supply and exhaust for engine room alone, in addition to that part derived from the main system.
3. The dynamo-room system, which is operated for the benefit of the dynamo room, and the forward compressor room.
4. The coal-bunker system, which furnishes fresh air to and exhausts from the bunker spaces.

The main ventilation system.—Supply: To supply fresh air to the hold and living spaces of the berth deck there is an armored ventilator amidships, opening under a light bridge on the superstructure deck. There are also several unarmored ventilators opening above into the open air. Two main ducts, from 10 to 24 inches diameter, run nearly the full length of the ship, well outboard, under the berth-deck beams, one on each side. From these ducts branches lead to the various compartments of the hold and to registers in the deck of the living spaces. Connected with these ducts are 6 steam fans, 50 inches in diameter, 2 on berth deck forward of fire-room bulkhead, 2 at forward end of engine room, and 2 at after end of same. Of these fans 2 draw fresh air through the armored ventilator; the remaining 4 can be used for fresh-air supply as well, drawing the supply through unarmored ventilators, but ordinarily are used as exhaust fans. The effective work of these 6 blowers can be used to supply the main ducts with fresh air, or by a combination of valves and dampers the collective supply can be turned into the fire room for forced draft at the expense of the living spaces.

Exhaust: A main duct leads on each side of the ship, well outboard, beneath the main-deck beams, for removing foul air from the living spaces on the berth deck. Branches from these mains, or openings directly into them, admit the foul air from the various compartments. In the forward portion of the berth deck these openings are controlled by registers, at will; in the after portion the openings are covered by gauze, and remain permanently open, except in wardroom, pantry, and after turret machinery space. The exhaust from the forward crew spaces is effected by the two forward steam fans. From the after living spaces the two after steam fans exhaust the foul air. Ordinarily the exhausted air is carried behind the boilers and is discharged from the mains into the fire room, and thence through the furnaces, or, as designed in the plans, it is discharged through the air spaces around the smoke pipe into the outer atmosphere. The temperature behind the boilers and in the superstructure above is somewhat diminished by this outward flow of air in the way described. Provision is made for discharging the exhausted air directly into the atmosphere if desired.

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[1] Since writing the above, I have learned that the superstructure is to be provided with a system of electric fans and air ducts for the artificial ventilation of this space.

The engine-room system.—Two steam fans of 30 inches diameter are located in the engine room, one for supplying fresh air and one for removing foul air. Air ducts are led into various parts of this space, and are connected with two ventilators opening into the atmosphere. These two fans are supplemental to the supply furnished the engine room by the main system.

The dynamo-room system.—Two "monogram" electric fans (9.4 by 10 inches) are located in the dynamo room, one to supply fresh air to, and one to exhaust foul air from this compartment and the forward-turret machinery room. Ducts to distribute and to carry off the air are connected with these fans and ventilators. The work of these fans has been unsatisfactory and intermittent; they are frequently out of order.

Coal-bunker ventilation system.—To secure the discharge of gases from the bunkers exhaust pipes running fore and aft through the bunkers, on each side, under the main-deck beams, provided with protected openings, are found leading through a 24-inch pipe, which passes through the smoke pipe. A constant upward current is induced by the draft in the funnel. Fresh air is supplied to the bunkers through a 6-inch pipe in the armored ventilator and distributed through openings which are protected from coal dust. The heat in the smoke pipe is the agent securing the constant delivery of fresh air.

The means above described are quite satisfactory and the ship is well ventilated. No provision exists for raising the temperature of the air when the outdoor temperature is low before it is discharged into the living spaces. If the fresh-air registers are kept open strong drafts are felt, even with the blowers running slowly, and such drafts are dangerous. Practically in cold weather the ventilation should be secured principally by exhaustion of the air in the living spaces, fresh cold air being discharged into the storerooms below. The hatch of the engine-room escape opens on the superstructure deck immediately below and abaft the armored ventilator. There is a constant discharge of hot air, smelling of oil, etc., through this hatch, and this air is partly returned into the ship through the ventilator at once. This defect can easily be remedied by extending the hatch upward so as to have it open on the bridge above, well above the ventilator. A temporary canvas shaft is in use for this purpose, but a permanent construction is needed.

The ventilation of the superstructure is effected by natural means alone. The doorways, hatches, numerous 12-inch deadlights, and deck ventilators, aided by several electric fans, are fairly efficient; but the high temperatures liable to be experienced here make it desirable to secure more active ventilation by means of artificial aid by blowers or increased openings. The turrets are not directly connected with the ventilation system. The smoke of the discharge of the guns is blown out of the bore by a jet of compressed air, leaving the turret fairly clear and free of odor.

FACILITIES FOR BATHING.

For the use of officers a lavatory is supplied, basin and bath tub, in the closet compartment. Fresh and salt water and steam for heating are provided. The engineer's force have a wash room in the fire-room compartment, with 2 douche baths. Deck buckets are more convenient than the awkward deep soapstone tubs, which have been removed, to the great convenience of the men. The floor of this room is cemented. The waste water is led into a depression in the double bottom under the fire-room plates. This depression or well holds only about 28 gallons, is generally full of water going into the bilges from other sources, and, if it were not so, its capacity is too small, if the men are allowed free use of water. Despite efforts, by frequent pumping, to prevent the waste water from overflowing it practically does flow directly into the bilge. This water is made impure by dirt, soap, epidermic scales, and organic excrementitious material from the skins of men working in fairly high temperatures, and is freely spread over the bilges by the rolling of the ship. The crew were not provided, originally, with any facilities for bathing. Two shower baths have been placed in the crew's water-closets, an unsatisfactory makeshift arrangement, which interferes with the proper use of the closets. The waste water from these closet spaces is discharged into the bilges, as is also the water used in scrubbing and cleansing the closet spaces. Duly considering the probable contamination of water-closet spaces, especially confined and contracted spaces used by a large number of men, and adding to these the impurities washed from the bodies of men, it is manifest that even with care there exists an unwholesome and insanitary condition of the bilges of the ship. The alkaline material, organic and putrescible, the temperature range and the moisture here furnish conditions favorable to the development of pathogenic bacteria, and there are not unlikely conditions of service which would allow this insanitary arrangement to become very serious, influencing gravely the efficiency of the ship. The attention of the commanding officer was called to all this, with a recommendation that a 600-gallon iron tank, fitted with a manhole plate and connected with flushing and discharge pipes, be located to receive all the unclean water. A small pocket in a starboard coal bunker, holding about 1½ tons of coal, seemed well suited as the location. Though approved by the captain, the recommendation was not considered of sufficient moment to cause an abatement of the nuisance. This recommendation is again repeated. It is certainly insanitary to freely pour into the bilge of a ship any excretory material from animal bodies, however dilute this material may be.

WATER-CLOSETS.

These are of the Bishop patent and are 17 in number—1 for the cabin, 4 for the wardroom and warrant officers, and 7 for the crew of 151 men. Three closets at after end of port-wing passage are reserved for use in battle. These closets are very unsatisfactory for use of the crew, the bowls being flushed and emptied by a hand pump, and the plumbing being intricate. The flushing is generally inefficient. The crew closet spaces are small, and prior to the placing of two deck ventilators, and the cutting of an opening in the bulkhead for driving fresh air in by an electric fan, were very poorly ventilated. No urinals were originally supplied. Two shallow metal urinals have been put in. Proper glazed urinals of porcelain, of which one is found in the officers' lavatory, should alone be allowed on board ship, both on account of neatness and cleanliness. Two movable, canvas-covered frames, fitting overboard from the forecastle, were secured for use as closets in mild weather, and aid materially in securing a sweet, untainted air in the superstructure. The Bishop closets should be removed and closet facilities with a constant flushing system be substituted for use of the crew. An objectionable reflux of sewage-stained water has been experienced in the bowls of the closets when under way at sea.

TEMPERATURES.

Practically the ship has done no cruising, and exactly what temperatures will be experienced remains to be seen. In the short trips made, the engine-room temperature has been 118° F.; the fire room, 116° to 142°, generally 122°; the forward-turret machinery space, 124°. In the superstructure during a heated term in July and August a temperature of 110° was several times noted. No case of heat exhaustion has occurred.

THE BRIG.

No special place for the confinement of offenders exists. The berth deck is used when there are prisoners.

FOOD AND CLOTHING.

The galley is excellently equipped. The food has been abundant, well cooked, and neatly served. The clothing of the men has been entirely satisfactory for this climate, except the white cover for the cap, which is for neatness and comfort inferior to the white canvas hats formerly in use. A proper, cool headdress for the men in hot weather is an article of equipment much needed in our service.

WATER.

An old-style distiller is on board, and has been very little in use, only often enough to prove its utility. The aeration is insufficient. Four tanks, averaging 600 gallons each, are in the hold. The persistent oil flavor of the water is irremediable as long as a single, detached boiler for distillation and auxiliary work is not provided. The Brooklyn water has been commonly used, and though at times containing a good deal of vegetable impurity and having an objectionable flavor, it has been wholesome. No means for cooling the drinking water is provided on this ship.

LIGHTING.

The illumination is electric, and sufficient, except in the superstructure and on the berth deck. For hygienic reasons it would be unwise to change the method of lighting on ships of this class, so dependent on artificial ventilation, to the primitive air vitiating and heat forming use of candles and oil. Below the main deck artificial light is constantly required.

HEATING.

A proper distribution of steam pipes is provided for heating the living spaces.

SICK BAY AND DISPENSARY.

The provision made for the care of the sick is admirable. The location in the superstructure is excellent. A neat bath tub, a Bishop closet, and toilet set are provided. The ventilation is as good as can be secured by natural means. In common with other portions of the superstructure, the sick bay is liable to have too high a temperature in summer heat for comfort, but in all respects the sick bay of this ship evidences a thoughtful consideration worthy of much praise. The dispensary opens into the sick bay; is convenient, with neat hardwood shelves and counter. The medical storeroom is cool and dry. It is too small to accommodate the stores and hospital equipment, but the insufficient space was supplemented by the construction of a special locker for liquors and inflammable liquids. Even with this, the hospital mattresses can not be stowed by the medical department.

STATION IN BATTLE.

The surgeon's station in time of action will be in the wardroom, primarily, but a careful study of the conditions likely to obtain impresses me with the conviction that the medical officer must needs be here and there to extend professional assistance where it is needed. The transportation of wounded through narrow, inaccessible turret ports, along narrow wing passages with sharp angular turns, can only be safely undertaken slowly and gently, and not in the hurry and confusion of an engagement.

GENERAL CONCLUSION.

In general terms, the conditions on board the *Terror* are those assuring a fairly good outlook for the comfort and well-being, from a hygienic standpoint, of officers and crew.

It is worthy of note that the galley space is made much cooler by the provision of port shutters, which open outboard and admit air freely. The entire superstructure would be greatly improved in point of light and ventilation by having similar ports and shutters. The deadlights could be centrally placed in the shutter, and serve, as at present, whenever the port need be closed. The size of the ports should be as large as the space between the beams would admit. Free ventilation could thus be secured at will, temperatures would be reduced, and the hygienic condition thereby improved, especially for service in warm weather, when the excessive heat is debilitating and harmful. This change is not urged, as the necessity for it on this vessel is not yet apparent, but such arrangements of ports in the original construction of a superstructure would be a great advantage to every such space considered as a living space.

In conclusion, the following sanitary recommendations affecting this vessel are submitted:

1. Removal of the Bishop closets from crews' closet compartments and substitution of same by others, to be continuously flushed.
2. Fitting of each closet compartment used by the crew with a sanitary porcelain urinal and removal of present shallow, metal, unsuitable urinals.
3. Construction of a tank to receive waste wash water, as recommended, to protect bilges from contamination.
4. Increased lighting of crew spaces on berth deck and in superstructure.

REPORT ON THE U. S. S. CINCINNATI.

By N. H. Drake, *Surgeon, United States Navy.*

The general health of the officers and crew has been good, and with the exception of one case of parotitis epidemica the ship has been free from epidemic diseases and in a good sanitary condition throughout the year.

During the year the ship was three hundred and one days in port and sixty-five days wholly or partly at sea. At the date of my assignment to duty on this ship, June 6, 1896, she was attached to the North Atlantic Squadron, and remained on that station until September 17, when we sailed from New York for Gibraltar to report for duty on the European station. On the way over we called at San Miguel, Azores, for coal, and remained there about thirty hours. We arrived at Gibraltar October 3, remained in port three days, and then sailed for Smyrna, arriving October 14.

With the exception of a few days at sea for target practice, we have remained in that port from the date of our arrival until the end of the year. At the time of our arrival there smallpox was prevalent on shore, and no liberty was granted to the crew (including the stewards of the messes), and officers were only allowed on shore until sundown. I have been told that very little attention is given to vaccination in that city, and that the percentage of mortality among cases of variola is very high; but I have not been able to obtain any statistics to furnish the Bureau.

A sufficient amount of vaccine virus was obtained to vaccinate every person on board ship who had not been vaccinated within a period of six months. Two hundred and twenty-nine persons were vaccinated and 78 were successful, a result that shows the necessity for frequent revaccination. The virus was obtained from Switzerland and was contained in glass tubes, each tube holding enough to vaccinate 4 persons. About the end of October liberty was granted to the crew to remain on shore until 8 p. m., and officers were given permission to remain on shore at night. Since that date liberty has been given at frequent intervals, and so far no case of variola, or varioloid, has appeared among the complement of this vessel.

Smyrna is a city of something over 200,000 people, of whom about one-third are Greeks, and the remainder composed of Turks, Armenians, and representatives of the various European nations. During the winter months, from November to March, there is much cloudy weather and rain, and the prevailing winds are from the north and east. So far during the rainy season the temperature has generally ranged between 50° and 60° F., but it sometimes falls as low as the freezing point, and snow is visible on the mountains near the city. The summer months are hot and dry, and I am told the temperature sometimes reaches 100° in the shade. During the spring and early summer months typhoid fever and diphtheria are common, and pulmonary diseases and rheumatism are very frequent during the winter season. The city is well supplied with hospitals, and most of them have been visited. The Greek hospital is the largest and most important one in the city, and I was told by the resident surgeon that it was the largest and oldest hospital in Asia Minor. It is a stone building 2 stories in height, quadrangular in shape, having a court and flower garden in the center. The total capacity is 600 beds and the average number of patients 400. This includes the inmates in the wards reserved for the insane and patients with contagious diseases in an annex building. The buildings are heated by steam. The wards are mostly small, containing from 6 to 10 beds, but some of them are large enough to accommodate from 25 to 30 patients. The operating room is of moderate size, and offers facilities for performing surgical operations under antiseptic conditions. Patients are received from men of war and merchant vessels of any nationality, and there is no charge for admission to the general wards. If a private ward or room is desired for a patient the expense is about $1 a day.

The British seaman's hospital can only accommodate 4 patients at present, but an addition to the building will soon be completed and the capacity will then be 40 beds. The annex will contain an operating room, which is to be equipped with all the instruments and appliances necessary for performing operations under perfect aseptic conditions. This hospital is supported by a tax of about 5 farthings a ton register on English vessels entering this port.

The Austrian hospital can accommodate 120 patients, and the charge for private room and service is about the same as at the Greek hospital.

The French hospital contains 40 beds, and is well adapted for the reception of medical cases. They have no modern operating room or facilities for performing aseptic surgery.

Besides the hospitals above mentioned, there are the Armenian, Dutch, Jewish, and 2 Turkish hospitals in the city.

VENTILATION OF THE SHIP.

The natural ventilation of the ship is good, and when in port with favorable conditions of weather, so that the hatches and air ports can remain open, it answers the desired purpose during the day; but at night, when the living spaces are crowded, the system of artificial ventilation is an absolute necessity. The natural means of ventilation is supplemented by the use of wind sails in hot weather. At the present time the blowers are not run during the day, but are in operation at night and used to exhaust the foul air. The artificial system of ventilation as arranged in this ship has its defects, but the faults have all been shown in the sanitary reports of this ship for 1894 and 1895, and further mention of them is considered unnecessary.

CLOTHING, FOOD, AND WATER.

The clothing issued has been of good quality and the only complaint brought to my notice was in regard to the discomfort caused by wearing the blue flannel undershirt in hot weather. While at sea in August, during very warm weather, several men suffered from prickly heat, and in every instance the flannel undershirt was assigned as the cause. I would suggest that for use in the Tropics and in very warm weather in other latitudes, that a white or gray knit undershirt of a light-weight woolen and cotton material be substituted for the flannel shirt now in use.

The supply of food issued to the crew is abundant and of good quality. At the present time fresh meat is served to the crew five days in the week, and, with the money from commuted rations, the messes purchase vegetables and fruit to supplement the rations issued from the ship.

Distilled water is used for drinking, cooking, and bathing purposes, and for the past two months the expenditure has been limited to 1,000 gallons a day.

SICK BAY AND MEDICAL STOREROOM.

The sick bay is so much obstructed by a torpedo tube and a rack for the storage of two torpedoes that it is barely adequate for the needs of the ship. Another objection is that it is a passageway to the yeoman's storeroom and paint locker. As a means of relief, I can only indorse the suggestions made in the first sanitary report from this ship.

The medical storeroom is between the berth and protective decks, in Compartment A 123, adjoining the one in which the dispensary is located, and convenient to the sick bay. Since I have been attached to the ship there has not been any leakage into the room, and the supplies contained therein have been well preserved.

RECRUITING ON BOARD.

Nineteen men have been examined on board the ship for enlistment during the year; 14 were accepted, and 5 rejected.

REPORT ON THE U. S. S. MONADNOCK.

By J. M. STEELE, *Surgeon, United States Navy.*

The *Monadnock*, a low free-board monitor, 2 turrets, was placed in commission on February 20, 1896, at Mare Island Navy-Yard, where she was built. She is 258 feet 6 inches in length and 55 feet 6 inches in beam. One turret is situated forward and the other aft of the midship section.

The cruising done since going in commission has been as far down the coast of California as San Diego, and as far north as the Straits of Juan de Fuca. In these trips the ship has proved to be comfortable, well ventilated, and of easy motion.

The longest trip made was to Port Angeles from San Francisco—about five days. The air on berth deck, at the termination of this trip, was somewhat close, as tests showed somewhat more than one part of carbon dioxide in the thousand. The hottest weather was experienced on the passage down to San Diego, the thermometer in the wardroom registering 83° F. The highest recorded in engineer's department was 130° F., on the trial trip, under forced drafts.

The living spaces for captain and wardroom officers are in the superstructure, between the turrets. This structure is of steel, secured to platform deck, and is an irregular octagon in shape. In the after part, starboard, are the quarters for the captain, consisting of one main cabin, stateroom, and bathroom, the combined cubic air space being 2,232 cubic feet. There are nine staterooms and pantry opening upon the wardroom country, the executive officer and navigator having rooms just outside of wardroom. These rooms are all alike excepting the executive's room, which contains 672 cubic feet while the others contain 432. The wardroom is light and airy and has 4,528 cubic feet. Each room has a large air port and one deck light.

A large hatch opens from the superstructure deck into the center of wardroom, and also 2 deck lights and 2 doors, 1 forward and 1 aft. There is no artificial ventilation for the cabin or wardroom.

These quarters are over the fire rooms and engine rooms, and to prevent the excessive heating 1¾ inches of cork are interposed. The smoke pipe, in passing through the wardroom, has a covering of mineral wool, which seems, as far as the limited experience goes, to answer the purpose for which it was designed, the highest temperature reached in the wardroom being 83° F. This observation was made in March, when it was comparatively cool outside and after steaming three days. These quarters, with constant steaming and in tropical zones would, I believe, become excessively hot. The superstructure deck is covered in, in part, and affords a small place for the men to gain access to the outside air at sea.

The water-closets are in the superstructure forward of wardroom, and are efficient. They are connected with the flushing system, and are constantly supplied with water, which keeps them, as a rule, clean and free from odor. When the fire mains are connected up, the flow of water through the water-closet system is diminished. There are 2 Bishop bowls in this ship, 1 in cabin and 1 in sick bay. These have so far worked well. There is a theoretical defect in the drainage system of the cabins, as the waste water from bath tub discharges into the soil pipe from the Bishop bowl. The traps so far have, however, worked perfectly and no odor has been perceived. The bath tub should have a separate discharge.

The berth deck is divided by transverse bulkheads and water-tight doors into compartments.

Compartment A 16 contains 3,034 cubic feet, and berths 11 men.

Compartment A 17 contains 10,526 cubic feet, and berths 63 men.

Compartment A 18 contains the forward turret support, sick bay, dispensary, workshop, machinery for working turret, and general wash room. The flooring of this space has been covered with sheet lead. The sick bay contains 1,408 cubic feet of space, and has a bath tub and Bishop water-closet. The dispensary contains 288 cubic feet, and is conveniently located, as also is the medical storeroom.

The bath tub, sink in the dispensary, and the waste water from the wash room drains into a tank, which is placed in the main hold. Running water is supplied through the ship. The drainage tank is kept pumped out, and answers its purpose well. Compartments B 1 and 2 are taken up by the fire rooms. Compartments C 1 and 2 are the engine rooms. These compartments are well ventilated, as will be shown later. The wing passages, outboard, around compartments B 1 and 2 and C 1 and 2, connect apartments A 18 and D 13. These passages are subdivided by water-tight doors. D 13 contains after turret support, dynamo room, the offices, prison, and crew space.

The prison contains 240 cubic feet, and is well ventilated. The compartment is warmer than the corresponding compartment forward, as the after engine opens into it, and also to the dynamo engine. There is a 2-horsepower electric blower for this compartment in addition to the general ventilating system.

Compartment D 14 contains crew space, lower wardroom, and warrant officers' quarters. The crew space has 3,744 cubic feet, and quarters for 22 men. Lower wardroom contains 1,672 cubic feet, and is occupied by one officer. The warrant officers' quarters, consisting of mess room and 2 storerooms, contains 1,728 cubic feet. There is a large after hatch opening into the space between the lower wardroom and warrant officers' quarters.

D 15 contains 5,012 cubic feet and berths 38 men; it has locker space for hammocks.

D 16 contains steering apparatus. Below the berths are the storerooms, magazine, shell rooms, holds, and below this are the double bottoms.

The capacity of distiller is about 1,500 gallons in twenty-four hours, and there are 4 fresh-water tanks with a combined capacity of 4,970 gallons.

The ventilation is accomplished both by the exhaust and supply systems. The exhaust ducts are on each side outboard and under the main-deck beams, running fore and aft. The supply is a natural one, and comes from 2 ducts which are more or less centrally located, 1 forward and 1 aft.

Two exhaust fans are located in compartment A 18 and the other 2 in compartment C 2. The 2 in compartment C 2 exhaust air from the 2 engine rooms also.

These two pairs of fans (exhaust) are connected by circular ducts in the wing passages. Slide valves, worked by hand, are fitted at all bulkheads. The ventilation pipes leading to ammunition rooms can be closed from berth deck by means of air gates, which are so worked.

The supply for the after duct is taken through 2 cowls at the after end of upper deck underneath the search-light platform. The forward supply leads down from the starboard side of conning tower, upper deck. The military mast serves as a discharge for the after part of the vessel; forward the discharge from the exhaust fans is through an opening on the port side of conning tower.

The 2-horsepower electric exhauster in the dynamo room has a double discharge, one with the port main duct and one through a deck light opposite the after turret and on the port side. The coal bunkers are ventilated through openings in hammock berthing on upper deck.

Independent ventilation has been provided for the engine rooms, each having an independent blower which draws air from the armored ventilator and distributes it through the rooms. The armored ventilator is fitted with a double casing, the space between the inner and outer serving as a natural outlet for the hot air, the inner space serving as a conduit from the upper deck. In order to diminish the suction of the fans, hinged covers are provided at the upper end of ventilator. When the weather permits, these should be kept open. There are 2 escapes from engine room, with mushroom covers, which act as escapes for hot air.

The fire rooms have blowers for forced drafts, which take the air from upper part of fire room and discharge into ash pits. Two large ventilators inside the smoke-pipe armor extend well below the main deck line. One in each fire room serves to supply fresh air. There is another space around smoke pipe, which serves to carry off hot air. The after fire room has an additional ventilator, which passes down through wardroom. To prevent blowers for the forced drafts drawing air from engine room, a screen has been fitted.

Each head has a ventilator which leads up to the superstructure and can be kept open in almost any weather. There is also a large portable ventilator over the steering room, which can be closed from below, and being strong and substantial can stand heavy weather.

The ventilation is good as far as the limited experience goes.

The opening for the supply duct forward is on the starboard side of conning tower and faces aft. In steaming ahead or when the wind is ahead this supply opening acts as an extractor. A large cowl so fitted as to be trimmed to the wind would remedy this defect. A canvas screen coming above the opening and placed at an angle to deflect the air down the duct was tried with success. Air also comes down to the berth deck through the turrets. There are two openings fitted for ventilators on each turret, which would supply a greater volume of fresh air if needed.

The vessel seems to be well ventilated and the cubic air space per man more than is usual. It seems that the method is excellent and preferable to the plenum method alone.

It would, in my opinion, be necessary for a vessel of this class to have two medical officers in time of action. In going into action the two parts of the ship are very much shut off from one another, owing to the fact that the water-tight doors would be closed.

There should be two stations where medical assistance could be had—one at the sick bay and the other in the lower wardroom. The hammock with a long painter has been used in lowering men from turrets, pillows and mattress being used, when they are lashed in lightly to relieve pressure and to give support. A wounded man can be lowered through the ammunition opening to the deck below, where the aids to wounded from the forward part of the powder division receive him and bring him to the sick bay. The stretcher bar designed for the transportation of wounded is too long to use in the turret. It is placed at general quarters at the hatch leading to superstructure, where it will be used in lowering men from this deck.

There were 830 sick days for the ten months this ship has been in commission.

Temperature observations.

Stations.	Mar. 9, 1896, during trial trip. *a*				Mar. 17, 1896, at sea en route from San Francisco to San Diego.			Mar. 18, 1896, at sea en route from San Francisco to San Diego.				
	10.30 a. m.	12 m.	3.30 p. m.	6.30 p. m.	5 p. m.	7 p. m.	9 p. m.	8 a. m.	12 m.	5 p. m.	7 p. m.	9 p. m.
	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*
Compartment A 17	61	62	66	69	69	69	70	64	63	71	70	66
Sick bay	62	62	63	62	68	69	70	66	62	63	64	65
Wardroom	68	71	73.5	72	81	81	82	78	80	80	81	79
Lower wardroom	62	63	66	66	72	70	68	65	70	73	73	75
Engine room	90	98	96	96	86	99	96	98	95	94	93	89
Fire room	100	124	*b* 140	115	120	120	118	118	125	115	120	120

Stations.	March 19, 1896, San Diego.					March 20, 1896, San Diego.				
	8 a. m.	12 m.	5 p. m.	7 p. m.	9 p. m.	8 a. m.	12 m.	5 p. m.	7 p. m.	9 p. m.
	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*
Compartment A 17	63	64	65	64	65	67	68	65	69	68
Sick bay	66	67	66	67	66	64	65	66	68	67
Wardroom	74	75	78	83	83	73	79	83	83	80
Lower wardroom	69	69	70	73	70	73	73	76	73	76
Engine room	95	94	90	80	82	79	82	83	84	83
Fire room	118	115	110	100	98	105	88	104	93	92

[a] Forced draft was on from about 11.15 a. m. to 4 p. m.

[b] The thermometer was very near a very hot door. True temperature was probably 125° to 130°.

Temperature observations—Continued.

Stations.	March 21, 1896, San Diego.					March 24, 1896, San Diego.				
	8 a. m.	12 m.	5 p. m.	7 p. m.	9 p. m.	8 a. m.	12 m.	5 p. m.	7 p. m.	9 p. m.
	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*
Compartment A 17	65	66	67	65	66	67	68	65	66	65
Sick bay	63	64	63	64	63	69	70	68	69	67
Wardroom	73	77	76	75	73	75	79	80	82	81
Lower wardroom	67	70	73	74	73	70	71	70	73	70
Engine room	88	92	90	95	90	105	102	99	100	95
Fire room	110	95	91	93	95	94	95	93	96	88

Stations.	March 25, 1896, San Diego, Cal.				
	8 a. m.	12 m.	5 p. m.	7 p. m.	9 p. m.
	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*
Compartment A 17	68	69	69	68	68
Sick bay	69	70	70	69	69
Wardroom	74	76	75	74	73
Lower wardroom	70	73	72	72	71
Engine room	90	91	92	93	94
Fire room	94	96	95	96	95

REPORT ON THE U. S. S. AMPHITRITE.

By JAMES E. GARDNER, *Surgeon, United States Navy.*

The general sanitary condition of this ship for the past twelve months has been very satisfactory. No epidemic sickness of any kind has been met. Deducting the time lost by minor accidents and injuries, the total of sick days has been gratifyingly small. The percentage of sick, including accidents and injuries, for the four quarters has been: First quarter, 1.52 +; second quarter, 1.69 +; third quarter, 1.31 +; fourth quarter, .805 +.

The changes referred to in my last report, undertaken to improve the ventilation and lessen the excessive temperatures, had not then been submitted to the crucial test of actual trial at sea with ship steaming under outer air, high, summer temperatures. Such a trial has been thoroughly given during the past summer. Starting from Key West, Fla., about the middle of June, working north and arriving at New York about the middle of July, then maneuvering with the squadron during the intensely hot weather of August, it has been found that great relief has been given to the men in the fire room and engine room. A lowering of the temperature to the extent of about 25° has been obtained, which, with the added relief of an accompanying purer air, has greatly bettered the former conditions.

The relief obtained, however, by the occupants of the superstructure has been slight, and that little has been chiefly in a very slight reduction of the heat. I can not express too strongly the need for a change in the means of ventilating this part of the ship. From the position of this superstructure, placed on the deck, which is only about 30 inches above the water line; the slightest sea makes it necessary, when the ship is under way, to close the doors and air ports with the one skylight opening to give air. The superstructure becomes then a closed box, and when it is taken into account that the water-closets for the officers and the head for the entire crew are shut up in this same space, shut out only by doors which are constantly being opened by the passing of officers and mess attendants, I think it is evident that some system for removing the heated foul air and introducing pure air should be introduced. If a system of pipes connecting with the blowers on the berth deck can not be managed, I would suggest a separate system for the wardroom and cabin spaces operated by a small electric fan worked by the ship's dynamos.

REPORT ON THE U. S. S. BOSTON.

By M. H. Crawford, *Surgeon, United States Navy.*

The health of the crew and sanitary condition of the U. S. S. *Boston* for the year has been fair, with the exception of five months passed in the Yangtse River at Shanghai, China, where we had an outbreak on board of Asiatic cholera. Three cases of heat exhaustion and 32 cases of intestinal catarrh and simple diarrhœa have also been returned. The outbreak of cholera has been made the subject of a separate report.[1]

The following table shows the ports visited during the year and the number of days in port and at sea:

Ports visited.	Date of arrival.	Date of departure.	Days in port.	Days at sea.
Mare Island, Cal	Nov 18, 1895	Jan. 3, 1896	2	0
San Francisco, Cal	Jan. 7, 1896	Jan. 19, 1896	12	4
Honolulu, Hawaiian Islands	Jan 31, 1896	Feb. 7, 1896	7	12
Yokohama, Japan	Feb. 27, 1896	Mar. 5, 1896	7	20
Kobe, Japan	Mar. 6, 1896	Mar. 7, 1896	1	1
Nagasaki, Japan	Mar. 9, 1896	Apr. 15, 1896	37	2
Elliott Island, China	Apr. 18, 1896	Apr. 19, 1896	1	3
Woosung, China	Apr 20, 1896	May 3, 1896	13	1
Shanghai, China	May 3, 1896	May 27, 1896	24	0
Chinkiang, China	May 28, 1896	June 8, 1896	11	1
Elliott Island, China	June 9, 1896	June 15, 1896	6	1
Shanghai, China	June 16, 1896	Sept. 11, 1896	87	1
Woosung, China	Sept. 11, 1896	Sept. 14, 1896	3	0
Chefoo, China	Sept. 16, 1896	Nov. 4, 1896	49	2
Chemulpo, Korea	Nov. 6, 1896	----------	56	2

VENTILATION OF SHIP.

In my last report I described the ventilation of the ship, the different compartments, and their air capacity. On the voyage from San Francisco to Yokohama, Japan, I found serious defects in the ventilation of the forward berth decks of this vessel, due solely to the battening down of all the forward hatches, in order to prevent the entrance of water which constantly washes over the bows and forecastle when in a head sea. The Sturtevant blowers have been in constant use and work admirably, but they are not sufficient to ventilate the berth decks when the forward hatches are battened down at sea. I would recommend that four electric fans be placed on the berth deck, which, I think, would keep up a free circulation of air through the after hatches and improve the purity of the air very much.

I earnestly renew the recommendations I made in my last sanitary report, that the water-closets for the crew be removed from the forward compartment of the berth deck. I would recommend the "head" to be placed on the port side of the upper deck, which space is at present occupied by the evaporating apparatus and ice machine. The latter could be placed where the "head" is at present located.

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[1] See page 47.

On account of the prevalence of variola in Japanese and Chinese ports, all of the crew and officers were vaccinated. Vaccine virus was obtained from the Government farm at Tokyo, and also some of the "Saigon" virus was used at Shanghai, China.

BILGES.

The bilges are kept clean, free from odor, and are accessible throughout.

WATER, CLOTHING, AND FOOD.

Distilled water is used altogether; it is of excellent quality, and has given perfect satisfaction. During the year the clothing and food furnished have been satisfactory.

ICE MACHINE.

The ice machine works admirably, and was especially useful during the hot season at Shanghai.

REPORT ON THE U. S. S. BENNINGTON.

By JOHN W. BAKER, *Passed Assistant Surgeon, United States Navy.*

There is nothing to particularly note for the first half of the year connected either directly or indirectly with the ship, save the rather interesting and hazardous trip made by 23 men in open boats during the month of February from French Frigate Shoals to Kanai, Hawaiian Islands, under the following circumstances: It seems, as narrated to me by one of the crew, now enlisted in the service and doing duty on this ship, that on the night of February 21, 1896, the American sealing schooner *Mattie T. Dyer*, owned in Gloucester, Mass., struck on the outer reef of French Frigate Shoal, and before any attempt could be made to get out provisions and water she went to pieces. Several of the schooner's boats were broken up or capsized in the attempt made to leave the ship, but finally 4 boats managed to get safely away with 23 men. There was no water in any of the boats; the only thing saved was a case containing two dozen tins of tomatoes. The captain directed all the boats to the island, a few miles away, where he hoped to get some water by digging wells. None was found fit to drink. They killed some sea birds, took some alive, and started in these open boats for the nearest land, 485 miles away. There was a good sea running, squalls were frequent during the night, sometimes accompanied by rain, and 3 of the boats used to heave to, riding to a drag during the night. The captain gave his compass to the mate, and by aid of his sextant and chart steered his course for the nearest of the Sandwich Islands. During the first thirty-six hours the men suffered greatly from thirst. The captain ordered them to throw sea water over themselves in order to keep the skin constantly wet, which was done. They now and then at night caught a little fresh water in the boat, but the quantity was inconsiderable. The live birds and tomatoes were served out each day in regular quantity to each man, and on the morning of the fifth day out they landed through the surf on the Island of Kanai. Food and a liberal supply of water were given, and the result was that most of the men were taken sick and vomited. On the following day another boat came in with the men in a more or less exhausted state. There were two boats that did not come in for eight days, which were finally brought in by steamer with the men in a pitiable condition, their tongues swollen, their secretions checked, and several in a mild state of delirium. The first boat, by braving the seas and squalls, had arrived with the men in a fairly good condition compared with those who lay to during the nights and consumed almost twice as much time getting in to land. They were cared for by the United States consul and eventually brought to the United States in this ship. One of the men, an intelligent American, told me he believed he passed urine only twice during the five days in the boat. There seems to be no doubt that the secretion of urine is greatly diminished and necessarily the elimination of urea and possibly other products of metabolism. Just how much this has to do with the delirium generally experienced among such unfortunate castaways is hard to say; but it seems to me that the diminished secretion of urine becomes at least an important factor in such causation. The great importance of keeping the skin wet with salt water under such conditions was shown, and also the keen oversight displayed by the captain in not killing all his birds, but keeping them alive in the boat to be served fresh each day.

There was a mild epidemic of la grippe during the ship's stay in Honolulu, but it caused no serious increase in sick days.

The remarkably cool weather enjoyed at Mare Island and San Francisco I presume is hardly noticed by the old residents there, but to one coming from the Eastern or Atlantic seaboard and from the interior States it seemed extraordinary and none the less refreshing. As soon as the Coast Range is passed, the thermometer drops from 20° to 30° F., the fresh sea breezes are encountered, and thereafter summer, with its torrid heat, as known in the Central and Eastern States, is forgotten. That this is a great advantage to the health and comfort of the crew, as well as forming an opportunity for daily drills to be carried out without the usual fatigue and discomforts, is readily to be seen. I can not speak so favorably of the water, which was execrable and nauseating. The water supply is the same furnished the town of Vallejo, and, I am told, each summer grows nauseous from decomposing organic matter, presumably of vegetable origin. As the ships are compelled to use this abominable water while under repairs at the navy-yard, I would most strenuously urge the necessity of providing them with pure distilled water from a plant to be supplied the yard. All persons living in the yard could also make use of this distiller, the cost and maintainance of which need not increase the pay roll, and yet the result would be health and added comfort to all who are so unfortunate as to be at the yard during the summer.

The latter part of August we arrived at Puget Sound for squadron drill and maneuvers, but unfortunately the object was defeated by the smoke from the forest fires in Oregon and Washington. Communication, so far as signals were concerned, was generally carried on by steam whistle, whose discordant and shrill notes disturbed the sick very greatly. The ships could not maneuver, of course, under such circumstances.

There was some trouble with the water supplied the fleet from the shore. When it came to a question as to its potability, one of the medical officers pronounced against it. This led to the appointment of a board to carefully examine the source of supply, as well as its storage basin. The report was adverse so far as potability was concerned. This led to an inquiry by the city authorities, and a general meeting was called, which resulted in action having in view the abolition of all objectionable features in the storage of the city's water supply.

The climate is said to be superb in June, July, and August, with bright, clear weather and a moderate temperature, as the reports furnished by the signal officer of the port show.

The natural advantages that this port offers can not be overestimated. With a harbor unequaled, so far as depth of water and protection from the sea are concerned; with a country affording fish, game, and beef, vegetables and milk; with a climate favorable during the summer months for drills and work of all kinds; with the unrivaled Puget Sound to maneuver in, it seems as if the Pacific Coast were unusually favored as compared with its Atlantic sister.

So far as rainfall is concerned, there is much less at Port Angeles than at either Neah Bay, at the entrance to Puget Sound, at the west or Port Townsend to the east.

At present a small steamer plies along the sound ports and calls daily, bringing the mail. But when the railroad enters and steel rails are laid along the natural breakwater, steamers and ships can lie there in plenty of water and take in products destined for the utmost corners of the globe.

Though fresh from the navy-yard, where she lay several months, there are still some changes that could be made to the advantage of the personnel and health of the ship's company. This would require the ship to be placed out of commission, as it is well understood no thorough overhauling can be given any ship when the crew is living on her. The ventilating system is defective and in many respects needs a change. It is faulty in construction and the leads are bad. Then the latrines should be altered. Now the receptacle is so narrow that the fæces do not drop to the bottom, where a large stream of water is constantly flowing, but they gather on the side, and it becomes exceedingly difficult to keep them clean and free from odor.

The fire rooms are too hot for men to work in while in the Tropics. They receive an inadequate supply of air from deck, and I have had to give considerable medical attention to the sufferers. Making the passage from Acapulco to La Libertad and Jiquilisco, I had served out at the close of each watch to each man 50 cubic centimeters of a distilled liquor called tequila, diluted with 30 cubic centimeters of water. This will have to be done while the ship is in the Tropics, as the men are thoroughly exhausted at the end of each watch. These disastrous effects appeared to be more seriously felt by the men who had recently shipped or joined the *Bennington* coming in from merchant-steamer service, where they have a place to go and sleep and a meal to eat after the exhausting watch. I would like again to call attention to the very unhygienic and unphysiological arrangement of feeding the men in the engine and fire rooms. The watch going on at 4 p. m. must eat at 3.30, though they have no appetite or desire, having already eaten at 12 o'clock and with their meal half digested at this time. They work under unwholesome conditions, poor, vitiated air, high temperature, and the hardest and most exhausting work in the ship until 8 p. m., when after a wash they turn in, to be called again for the 4 a. m. watch, and come off at 8 a. m. after having done eight hours of this work under most unfavorable conditions and without a meal or any refreshment for some seventeen hours. They are generally exhausted at this time; they have no desire to eat. No wonder a man who has eaten his ration of three meals in seven hours, who goes without food for the next seventeen hours, eight of which he puts in at the most exhausting labor under the most unfavorable conditions, should drop at his work from dizziness and have to be carried on deck or be brought out with thermic fever. It is only necessary to make the desired changes at the galley so that a cup of hot coffee and some lunch can be served out to the men at 8 p. m. and a cup of coffee and a lunch at 4 a. m.

I hope when the ship is overhauled that all the woodwork will come out of the lower wardroom, the place used now entirely for rooming purposes, the mess room being on the spar deck. So much woodwork adds much to the discomforts in hot weather. A latticework of wire, sufficiently strong to suspend books from, and along which curtains can be drawn, will afford each officer all the privacy necessary, and during the nights in the Tropics the curtains can be drawn aside and the air allowed free circulation, which has the same effect as doubling or trebling the initial space furnished each officer. It is easy to see its great advantage in warfare, its freedom from splinters, and the danger of fire lessened. These remarks can be extended with almost equal pertinency to the cabin and mess room, though the necessity does not exist to the same degree.

The distiller (Baird's) works admirably, and there is no better water in the world to-day than the water supplied this ship. Perfectly pure, well aerated, it is drunk in large quantities, and enteric disease is unknown here. When we deduct the injuries and the venereal cases we find but little real disease in this ship, and it has not been exposed to any epidemic or endemic influences since I have been here, save the few cases of malarial origin which nearly all ships get while lying at Mare Island. Just what relation this disease may hold to the water supply would be interesting to note. We certainly have had no cases on board that could not be traced to this source.

Early in December the ship left San Francisco for survey of Jiquilisco Bay, Salvador, and stopped in at Acapulco, Mexico, and La Libertad, Salvador, on her way south. No disease was contracted at either place. In connection with the plasmodium malariæ and its possible spread by the mosquitoes, according to Dr. Manson's theory, it is of interest to hear that during the dry season in Acapulco, a notoriously malarial spot, neither the mosquito nor the malaria is found.

A few cases of febris ephemera, without initial chill, with no marked variations in temperature, and recovering promptly without quinine, have been noted the past quarter, but I have yet to see the severe type of malarial disease spoken of as peculiar to this climate. This is the winter, the dry season for Salvador on the Pacific coast, and since our arrival here there has been nothing but clear blue skies, good breezes, almost constant temperature (79° to 85°) day and night, and the health of crew and officers has been all that could be desired. The absence of fresh provisions has not been felt; good meat, abundance of oranges and pineapples, lemons, eggs, and poultry can all be obtained, though not in large quantities, and some time is generally spent in collecting the same.

The ship crossed the bar at the entrance of Jiquilisco Bay and came inside Sunday, December 27. We no longer roll at our anchorage, all ports are opened, all available wind sails (we need more) are up, and the refreshing breezes from the north are blowing all through the ship.

Many of the crew sleep on deck under the awnings, and at present the climate is all that can be desired. In the meantime the crew is divided into two working parties—one goes each day ashore on the islands and mainland, erecting signals, and the other works about ship. This affords them a change of occupation, and their leisure noon hours, from 11.30 to 2.30, are taken up in sleep and rest. The idea is to do the work from 6 to 11 and from 2.30 to sunset, and avoid all exposure to the sun at the hottest part of the day. Large straw hats have been supplied the boating parties and shoes discarded generally. Flannel as an undershirt is worn next to the skin and these undershirts are changed for dry ones when the working party returns to the ship. Thus all chilling of the skin is avoided.

The expenses for the last quarter have been unusually large, owing to the large amount of stores required, as the ship was to engage in a survey in a country little known, where nothing in the way of medicine could be obtained save at a greatly increased cost, and where her stay might be prolonged indefinitely. Taking into consideration the possibility of needing much medicine and the high freight rates all along this coast, I deemed it best to start well equipped and supplied for this expedition.

REPORT ON THE U. S. S. MONTGOMERY.

By L. W. Curtis, *Passed Assistant Surgeon, United States Navy.*

The general health of the ship's company has been good. No disease epidemic in character has occurred, and no deaths. Of the few cases of serious acute disease none could be attributed to insanitary conditions existing on board. The average complement for the year was 229, including officers, sailors, and marines. The total number of admissions to the sick list was 211, distributed as follows: First quarter, 73; second quarter, 47; third quarter, 58; fourth quarter, 33. The total number of sick days was 1,191, giving an average daily sick list of 3¼. Thirty cases were invalided to hospital.

The ship has no sick bay. Three billets, adjacent to the dispensary, are available for the hammocks of the sick, in the after berth-deck compartment, which is the mess and berthing compartment for the petty officers and marines. This condition of affairs necessitates, in the interests of both the sick and well, the transference to hospital of all cases at all serious, and accounts for the relatively large number so invalided.

An addition has been made to the main battery and the ship's complement augmented to 250.

As the ship is greatly crowded, some of the petty officers being berthed in storerooms, and as the sick list averages 3 and upward daily, there seems no impropriety in recommending a rearrangement of the living spaces with the view of providing a place for the sick and more space for berthing the crew. From a medical officer's point of view, proper arrangements should always be made for the sick, but it is plain that in the construction of this vessel no such idea has prevailed.

During the year thirty-four days were spent at sea and three hundred and thirty-two days in port. Thirty-eight days were spent at Key West—from July 30 to September 8. Upon information received immediately before sailing for Key West that smallpox was epidemic at that port, all hands were vaccinated, except 20 men, who presented satisfactory scars of recent vaccination. The epidemic was under control when the ship arrived, no new cases having developed for a period of two weeks previously, and none subsequent to our arrival. The total number of cases was 60, with 10 deaths, all but 3 among the colored population.

The health authorities used vigorous measures to control the disease. The sick were promptly moved to a temporary hospital outside the town; thorough disinfection of infected houses and compulsory vaccination were rigorously enforced. In carrying out the last measure the ship gave aid, under orders from the Navy Department, boarding all craft leaving the harbor and requiring them to present certificates of vaccination for all on board.

General liberty was not given in this port. The crew suffered some discomfort from heat eruptions and boils, due to the continuous high temperature, which averaged 85° F. day and night. As the coarse regulation flannel underclothing seemed to increase dermal irritation and general discomfort, on the recommendation of the medical officer the men were permitted to discard underclothing during the day. Some of the officers and many of the crew slept under awnings at night. No sickness except the trifling maladies mentioned and one mild case of heat exhaustion occurred. The latter was in the person of a machinist, who was suffering from general debility of obscure origin, and who was on our return sent to hospital.

Fresh provisions and ice were obtainable in Key West at prices current in home ports.

Other ports visited during the year were Charleston, S. C., New York, Hampton Roads, New London, and Norfolk. No epidemic disease existed at these places.

No changes have been made in the system of ventilating, heating, lighting, or water supply during the year, except in the dynamo compartment, where, by means of increased openings in the supply air duct and the use of an electric blower, the temperature has been reduced about 25° at ordinary temperatures.

It has been found necessary to frequently examine the water for saline impurity due to too rapid distillation. The remedy is found in disciplinary measures applied to the people immediately in charge of distilling.

The officers' water-closets are often in an unsatisfactory condition, due chiefly to negligence on the part of some of those using them. Fæcal deposits are frequently in evidence on the sides of the partially filled basins. A constant flushing system or replacing the funnel-shaped basins with others of larger area would avoid this insanitary condition.

The head is kept in a satisfactory condition and quite free from odor by seeing to it that decomposing salts, which tend to deposit on the sides of the urinal, are removed by daily scrubbing with a stiff brush. The bulkhead which separates the head from the forward gun-deck compartments has two doors, as originally constructed, or rather two openings with short latticed screens. They stand continually open and practically serve no purpose whatever. A remedy has been found in placing tin over the lattice and in lengthening and applying spring hinges. They should be replaced at a favorable opportunity with solid doors.

The ventilating system is efficient when the blowers are kept at full speed. Watchful attention is necessary, however, to insure this condition. In cold weather it is practically impossible to maintain proper natural ventilation on account of the direct exposure to many harmful drafts.

REPORT ON THE U. S. S. CASTINE.

By Henry D. Wilson, *Passed Assistant Surgeon, United States Navy.*

The general health of officers and crew has been excellent.

From the beginning of the year to the 25th of June the ship was at Montevideo, but from the latter date until September 22 various ports in the vicinity were visited. Only a short time was spent in the harbor of Rio Janeiro, namely, from August 23 to September 16. During that period only 4 cases were admitted to the sick list, and 2 of these were for contusions. No liberty was given the men at that port and no officer was allowed to remain on shore after sunset.

On September 22 the ship returned to Montevideo and remained there until October 10, when orders were received to proceed to the navy-yard, Norfolk, Va.

On the way north stops of one day each were made at Bahia and St. Lucia. Liberty was not given to the crew at those ports.

On November 7 the ship arrived at Norfolk, Va., where she has remained, undergoing extensive repairs.

The woodwork in the compartment occupied by the petty officers is being removed. This will give more air space, and in some parts add over 3 inches to the space between decks.

Two ventilators are to be led in the forward part of the fire room. At sea the heat in this part of the ship has been almost unbearable, and it is to be hoped that the added ventilation will in a measure remedy this.

The blowers supplying fresh air to the dynamo room will be replaced by larger ones. The lead of the pipes from these blowers has been changed, so that the opening for fresh air, instead of being above and near the opening for the exhaust, as formerly, is now low down and nearly opposite the exhaust.

The hatch coamings of the top-gallant forecastle hatches are to be increased in height 9 inches. This should prevent the spray and wash water from running below to the berth deck, as it formerly did.

The covering of the steel deck in compartment No. 3, on the berth deck, has been very unsatisfactory. Before the present plan was adopted a layer of asphalt three-fourths of an inch thick was put over the steel; this was then covered by a thin rubber matting.

The asphalt ridged and cracked so as to allow the water to run under it and settle in various places. In carrying out the present plan a thin layer of paving cement was first put over the steel deck and allowed to become thoroughly dry. A layer of rubber cement was then put on and very heavy linoleum laid before the cement was dry. This method practically renders the space useless for two weeks, as it is necessary to securely shore the linoleum in place from the upper deck while the rubber cement is drying, but this temporary inconvenience will be much more than compensated for if dryness of the deck is obtained.

A new steel scuttle butt has been supplied in place of the old wooden one.

During the past year 2 interesting cases of syphilis have been recorded. In these cases the disease was inoculated by tattooing, the initial lesion appearing on the forearm. The history of both cases seems to be clear and direct.

REPORT ON THE U. S. S. KATAHDIN.

By J. A. Guthrie, *Passed Assistant Surgeon, United States Navy.*

The *Katahdin* is constructed for ramming purposes. She is of 2,155 tons displacement, 250.9 feet long, and 43.5 feet beam, with an average draft of 16 feet. The only covering is an arched armored deck varying in thickness.

LIVING SPACES.

The ventilation for the living quarters is by the exhaust system (Sturtevant blowers). There is an armored shaft, 5½ feet in diameter, which projects some 12 feet above the water line, and consists of two concentric tubes. The inner tube, 3½ feet in diameter, allows the exhausted air to escape a few feet above the outer tube which surrounds it. The fresh air passes down through the outer tube and is supplied to the different compartments by secondary conduits. The fresh-air supply is not at all times equal to the exhaust in the various parts of the ship, and the resulting rarefication has, at times, an uncomfortable effect upon the ears.

In the following table will be found in detail the air space in each compartment:

	No. of occupants.	Total cubic air space.	Average cubic air space per occupant.
Cabin and wardroom:		*Cubic feet.*	*Cubic feet.*
State rooms	7	1,351	193
Country		1,734.3	247.7
Galley	1	737	737
CREW SPACES.			
Dynamo room	4	896	224
Paymaster's storeroom	1	300	300
Berth deck:			
Compartment A 4	16	1,820	113.7
Compartment A 8	60	5,086	84.3
Compartment D 3	8	2,143	267.8

MEDICAL DEPARTMENT.

There is no sick bay, nor, from lack of space, can there be room allotted for one. Surgical and even medical work is rendered exceedingly difficult and at times practically impossible from the poor facilities at hand. Instead of a dispensary, three lockers, situated outboard, is all the space that can be utilized for storing medicines, and a small shelf is the only convenience for compounding prescriptions. From the small size, irregular shape, and damp character of the medical storeroom, besides the fact that it is filled partially with pipes, this compartment is unfit for the purpose for which it was originally intended.

In conclusion, I can say that the general health of the officers and crew has been good considering the circumstances. As in all metal ships, there is, at times, much condensation, producing a dripping in the living quarters. The prevailing diseases have been of a catarrhal or rheumatic nature, possibly owing to the dampness and lack of heating facilities during the early winter. This dampness in the officers' quarters has been improved recently by the addition of more area of steam heating apparatus.

REPORT ON THE U. S. S. BANCROFT.

By E. M. Shipp, *Assistant Surgeon, United States Navy.*

The sanitary report on the U. S. S. *Bancroft* covers a period of four months. A few days after I joined the ship at Annapolis, Md., she sailed for New York, where two weeks were spent at the navy-yard in making repairs and alterations. The wash room on berth deck, formerly used by cadets, and the lockers, except those in the first and second compartments, were removed to give additional berthing space for the crew. The two storerooms under the third compartment of the berth deck were converted into coal bunkers and one of the bathrooms under the forecastle into a prison cell. The other bath and wash rooms were fitted up as storerooms. The "head" on the starboard side was removed also and the space utilized as a storeroom for paints, etc. The dispensary has been transferred to the space formerly used as an armory, which is situated in the third compartment of the berth deck, on the starboard side. It is much larger than the old one and more conveniently located, but it has many objectionable features. The small coal bunker situated immediately beneath the floor of the dispensary has to be filled by passing the coal through the dispensary; consequently all the medicines have to be taken out until the bunker is filled and then replaced after the place has been scrubbed. While the coaling is in progress the dispensary is rendered absolutely useless, and the medical officer is placed at a great disadvantage in treating the sick.

I would respectfully suggest that the dispensary be moved from the third to the second compartment, where it would be just as conveniently located and entirely clear of all coal bunkers. The old dispensary is now used as an armory. The means for caring for the sick on board this ship are poor. There is no sick bay. The third berth-deck compartment is used for swinging the hammocks of the sick, but it is in many respects undesirable. The berth deck is dry and the natural ventilation is very good. The system of artificial ventilation has not been in operation since I joined the ship, consequently its efficiency or defects can not be detailed at present. The temperature of the fourth compartment on the berth deck is rather high when under way, and I believe would be very uncomfortable in a warm climate, owing to the fire room being situated immediately under it. The four after wardroom staterooms are not well ventilated, owing to the location of the steam steering engine just below the deck of the after part of the wardroom and the close proximity of the water-closets. When at sea with the air ports closed, the steam from the steering-engine room enters the wardroom, creating a disagreeable odor and causing the atmosphere to become very damp and warm. While the ship was at the navy-yard, New York, a ventilating tube was put in, from the steam-steering-engine room to the poop, which has improved the ventilation somewhat. I would recommend that a ventilating shaft be carried up from the compartment just abaft the wardroom through the cabin to the poop deck, and also that the water-closet compartment be shut off from the wardroom by a light wooden door. The old wardroom water-closets have been replaced by new and modern ones, which are more satisfactory in every respect. Nothing but distilled water has been used for drinking and cooking purposes. The theoretical capacity of the condenser is 1,000 gallons per day, but the average amount made will not exceed 500 gallons, which makes it necessary for the distiller to be in operation daily.

The ship sailed from New York on September 15 with a crew of 112 men, and a draft of 24 extra men, making 136 in all. Some of the men were obliged to sleep on the spar deck, and those sleeping between decks were very much crowded, but none of them seemed to suffer any ill effects from it. The health of the crew has been very good; no deaths, no accidents of any serious nature, and no epidemic diseases. One case of appendicitis developed after our arrival in Smyrna and was transferred to the British Seaman's Hospital. Smyrna is a place of about 300,000 inhabitants. The surface drainage is bad and the majority of the streets are narrow and filthy. There are 6 hospitals in Smyrna, but they are all small, with the exception of the Greek Hospital, and not very well equipped. When we arrived in Smyrna, there was an epidemic of smallpox on shore, which prevented the men from having liberty until they had all been revaccinated.

SPECIAL REPORTS.

FIFTEENTH ANNUAL REPORT OF THE UNITED STATES NAVAL MUSEUM OF HYGIENE.

By N. L. BATES, *Medical Director, United States Navy.*

The official recognition of the United States Naval Museum of Hygiene dates from August 7, 1882, when an appropriation of $7,500 for "Naval Museum of Hygiene; for rent of quarters necessary for the preservation of objects already collected; transportation of contributions intended for exhibition; preparation of models and drawings to be used in the illustration of sanitary science and its progress" became available.

A laboratory for the investigation of matters pertaining to naval hygiene had been established under the Bureau of Medicine and Surgery in October, 1879, and from that date objects of interest and value had gradually accumulated until it was desirable to arrange and classify them as a collection, and on January 1, 1882, the house No. 1744 G street NW. was rented for the naval dispensary, the laboratory, and the museum.

At the eighth annual meeting of the American Public Health Association, held in New Orleans in December, 1880, the question of the advisability of a national museum of hygiene was referred to its executive committee and advisory council, and a favorable report was made at the next annual meeting in 1881. This, in 1882, was followed by an indorsement of the Naval Museum of Hygiene, and at subsequent meetings of this association favorable action in regard to the museum has been frequently taken.

In September, 1882, the library of the Bureau of Medicine and Surgery, comprising some 3,400 volumes, was transferred to the museum, and October 25, 1882, Medical Director J. M. Browne was ordered in charge of the Museum of Hygiene.

Prior to that date the officers connected with the duties of the laboratory and museum had been ordered to special duty in Washington, and their names do not appear in the registers as connected with the museum.

The museum and dispensary were removed from 1744 G street to 1707 New York avenue on July 1, 1887, and the museum transferred to its present location July 1, 1894.

This brief account of the origin and history of the museum I have embodied in this report for the reason that I have recently had occasion to verify some of these dates, and having with some difficulty made the record it seems worthy of preservation.

I believe that this was the first public museum of the kind in the United States and the second in the world. In its establishment and administration there have been many difficulties, most of which have been overcome. Thanks to the efforts of the Surgeon-General and the honorable Secretary of the Navy, the buildings and grounds formerly occupied by the Naval Observatory were in 1894 officially transferred to the medical department of the Navy for the Museum of Hygiene.

The buildings required extensive repairs to adapt them to their new uses, but these have been made, or are near completion. The museum is now in a permanent building admirably adapted to all its purposes. Exhibits are arranged by classes and can be compared and studied. There is ample space for the library, lecture room, chemical and bacteriological laboratories, and for the first time in the history of the museum we are in position to utilize and make available all its advantages.

The storm of September 29, 1896, uprooted and broke down many of the old trees, and damaged roofs, gutters, etc. The grounds in front and at the sides of the main building were cleared, trees trimmed, and rubbish removed and the ground plowed, graded, and put in grass. The roads were also put in order, some extensions made, and the damage to buildings repaired.

During the past year the steam-heating plant has been completed and has proved to be efficient and economical. The old and unsightly barn and coal sheds were removed and a new coal shed erected.

Plans and specifications for extensive repairs to the west wing or annex have been prepared and a requisition for the work has been approved.

The work of the museum, laboratory, and library has been carried on under favorable conditions, and quite satisfactory progress has been made. An exhibit for the Centennial Exposition at Nashville having been requested, 23 cases of museum exhibits were forwarded and are now on exhibition there. The officers of the museum have devoted considerable time to the microscopical outfits for hospitals and ships. Two forms of outfits have been approved. Five outfits have been received and inspected for issue and 10 more are expected shortly. Some 30 old instruments have been surveyed and reported upon.

The library has received the usual additions of State, municipal, and other reports and transactions. Important contributions have been received from Medical Director A. L. Gihon and Surg. S. H. Dickson. The latter gave the library of his father, the late Prof. S. H. Dickson, which contained many scarce books and pamphlets, and added 719 numbers to our library list, not including duplicates.

The current journals have been received and a few important works purchased.

The library on July 1 numbered 11,646 volumes and 8,039 pamphlets. Number of exhibits in museum, 1,896. In the laboratory 25 examinations of water from various sources and 177 examinations of urine have been made, besides miscellaneous examinations, subjects of special reports, and experimental work on formaldehyde and other disinfectants.

REPORT OF THE MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.

By N. L. BATES, *Medical Director, United States Navy.*

In obedience to the Department's order of August 31, I have the honor to submit the following report of the proceedings of the twenty-fourth annual meeting of the American Public Health Association, held at Buffalo, N. Y., September 15 to 18, 1896:

The association met in Ellicott Square Building, at 10 a. m. September 15, and was called to order by the president, Dr. Eduardo Liceaga, president of the superior board of health of the Republic of Mexico.

From the first meeting until the closing session, with the exception of the afternoon of September 18, three daily meetings were held, and with brief intermissions the time was fully occupied from 10 a. m. to 10 p. m. each day.

The Dominion of Canada, Republic of Mexico, and some 30 or more States of our Union were represented by the presidents or secretaries of the boards of health of their respective States or Provinces. The United States Army, Navy, and Marine-Hospital Service each sent one or more delegates, and there were also present as members of the association many civil engineers and physicians who have gained distinction in sanitary science.

The papers to be read and the reports of committees were generally classified, and entire sessions were devoted to some of the most important subjects. Thus the morning of September 15 was given to the consideration of car and steamboat sanitation, and included the cleaning, ventilating, heating, and disinfecting of the usual means of passenger transportation. Animal diseases and animal foods, including especially milk, as sources of human infection occupied the greater portion of the afternoon session, and in the evening there were addresses of welcome and the annual address of the president.

At the morning session of September 16 there were 4 reports and papers on "Disposal of garbage and refuse," followed by a discussion, in which some ten or twelve members took part.

At the morning session of September 17 Maj. Charles Smart, United States Army, chairman of the standing committee on the pollution of water supplies, presented a report of 100 or more pages, which was not read, but will be published in the annual volume of proceedings.

He gave the association an abstract of the work already done, which is only preliminary to an exhaustive consideration of water pollution, chemical and bacteriological examination, and methods of purification of water supplies. This is one of the most important committees of the association, and its work, which is continued from year to year by some eight or ten prominent chemists, is of the greatest practical value.

A committee on disinfection and disinfectants made a report to the association in 1888, which was printed in a separate volume of more than 250 pages. This report is still very valuable, but the committee having been discharged on the presentation of its report, the association decided this year to appoint a new committee on the same subjects, to continue the work and bring it to the level of recent discoveries and research.

During the last year I made some investigations at the Naval Museum of Hygiene on the use of formic aldehyde as a disinfectant, with special reference to its use for the clothing and personal effects of officers and men on board ship. The results were favorable, and brief mention of them was included in a report made to the Surgeon-General of the Navy. This agent has recently been the subject of examination by officers of the Marine-Hospital Service, of the Bureau of Animal Industry, and of several of the State boards of health. Some brief papers were read before the association, and Dr. Kinyoun gave an abstract of an extended paper on its use for sleeping car, baggage, and quarantine disinfection.

The destructive action of formic aldehyde on disease germs has been fully proven. Professor Robinson, of Bowdoin College, claimed to have disinfected a room of 3,000 cubic feet in one hour's time by the formic aldehyde generated by a special lamp of his own device from 1 liter of methyl alcohol. Cultures of bacteria were killed under bed-clothing, in a mattress, and under one-half inch of sand. The amount of formic aldehyde must have been much less than 1 per cent. Dr. Kinyoun stated that air saturated with formic aldehyde killed germs in from one and one-half to two minutes. Exposure to 1¼ per cent of the gas for twenty-four hours resulted in the death of germs protected by 12 layers of blankets or 30 to 40 layers of cotton sheeting. The bacilli most easily killed were those of diphtheria, and the next weakest were tubercle bacilli. In the proportion of 1–10,000 formic aldehyde is an efficient deodorizer.

Formic aldehyde can be readily and economically applied. If generated by an inexpensive lamp the cost is that of the wood alcohol consumed. In 40 per cent solutions it is commercially sold under various names at from 50 cents to $1.50 per pound.

It does not injure fabrics. In my experiments gold lace, gilt buttons, sword belts, caps, book bindings of fugitive colors, and many other more or less suspicious articles, were exposed to its vapors for forty-eight hours without injurious results. I found that polished steel was slightly acted on, but polished brass was not affected. Book-bindings of red, green, and blue cloth, some of them in new and bright colors and others faded, were not changed. Dr. Kinyoun has made a very thorough examination of its action on ribbons, silks, dyed plumes, cotton and woolen goods, leather, etc. He found only two colors that were acted upon. One was Congo red, the other an undetermined aniline dye. He also noticed its action on polished steel. This effect is probably due to a small amount of formic acid, generated with the formic aldehyde, and which is also volatile.

One objection to formic aldehyde as a disinfectant is that it does not readily penetrate thick articles, like blankets and mattresses, unless a partial vacuum has been produced. This objection, however, applies with equal force to other disinfectants now in general use. Another objection arises from the irritant effects of the vapor upon mucous membranes and to some extent upon the skin. Nearly every one who freely handles formic aldehyde becomes painfully conscious of its irritant effect upon the eyes and nasal mucous membranes, and unless mattresses, underclothing, etc., are thoroughly aired after its use, any remaining formic aldehyde is likely to volatilize from the heat of the body and cause irritation. Ammonia unites with and neutralizes formic aldehyde; its vapor is equally penetrating and will remove any disagreeable effects. Attendants should be careful to avoid the fumes of formic aldehyde as much as possible during and after its use. The fumes are disagreeable and irritating, but not poisonous or dangerous.

Formic aldehyde is best used in as dry a form as practicable. With steam or water it is not so efficient as in vapor, although dilute solutions are valuable for surface disinfection.

Several forms of special lamp for the generation of formic aldehyde have been devised and three were shown at the association. No statements were made giving the percentage of yield in actual use, and, although satisfactory results were shown, further information in this direction is desirable.

The solutions in commerce are practically 40 per cent formic aldehyde in water or methyl alcohol. These may be readily used in the following manner: In a compartment which can be closed, pile the clothing, etc., loosely, with alternate layers of towels, sheets, etc., which have been well-dampened with the solution, then cover all closely with a tarpaulin and leave undisturbed for twenty-four or forty-eight hours.

I have given considerable space to this subject in my report, as, in my opinion, the use of this disinfectant will remove the objections which naval officers make to the exposure of their uniforms and other personal effects to ordinary methods of disinfection.

Several papers on public health in the Republic of Mexico were read before the association; also papers or reports on "Nomenclature of diseases and forms of statistics," "The transportation and disposal of the dead," "The prevention of blindness," "On isolation hospitals," "National health legislation," "Sanitary administration," "Public baths," "Alcoholic drinks," "The bicycle and its sanitary aspects," and on yellow, typhus, typhoid, and malarial fevers, dengue, and diphtheria as related to public health. Serum diagnosis included a very important paper by Dr. Wyatt Johnson, of Canada, on the diagnosis of typhoid fever.

The method as advocated by him is now being put to practical use in Quebec, where the board of health will make the necessary examinations for the medical profession, free of charge. (Public Health Reports, October 23, 1896, p. 995.)

The executive work of the association included favorable action on several resolutions connected with papers and discussions and the appointment of some new committees on important subjects. None of them had any special relation to the Navy or naval hygiene.

Philadelphia was selected as the next place of meeting and Dr. Henry D. Horlbeck, of Charleston, S. C., was elected president for the coming year.

HANDLING AND CARE OF WOUNDED IN MODERN NAVAL WARFARE.[1]

By WILLIAM K. VAN REYPEN, *Medical Director, United States Navy.*

How best to handle and care for wounded in modern naval warfare is a problem that now confronts naval surgeons. It is thrust upon us by the energy and accomplishments of experts in construction, ordnance, and engineering. While they have so successfully fulfilled their mission of destruction, we must not be laggards in our still more important work of succor to the wounded and helpless. It is theirs to destroy. It is ours to save.

The conditions under which we find ourselves in the present day of battle ships necessitate a radical departure from our former methods of treatment of wounded men in action, and their subsequent care. In the days of wooden ships, with flush gun and spar decks, admitting of comparatively easy transportation of wounded, there was very little difficulty in moving men injured in action to the sick bay, where they could receive every needed surgical attention. The surgical staff was a unit, exercising its function in a circumscribed sphere. Its work was brought before it; now it must seek it.

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[1] Read before the Twelfth International Medical Congress, held at Moscow, Russia, August 19–26, 1897.

A modern battle ship is a honeycomb of steel, each cell containing its quota of workers, all acting harmoniously and in concert toward the accomplishment of the desired end, the overthrow of the adversary. Separated from their fellows by steel decks and water-tight doors, some means for their assistance in time of distress must be devised by naval surgeons; means that will not interfere with the fighting efficiency of the whole, and yet sufficient to assure the combatants that if disabled in the performance of their duty they will not be cast aside as useless incumbrances.

Anyone familiar with the construction of a modern battle ship will readily see the impossibility of caring for wounded men as in the days of wooden ships. The object of making closed compartments is to have them closed in time of action. The object of battle plates is to have them screwed on in time of battle. By as much as these precautions are neglected, by so much is the efficiency of the fighting machine decreased. In the tops, in the superstructure, and in some of the living spaces men may be reached and cared for, but never again in modern warfare will the sick bay be the place where all the wounded will be brought during an action, and where the surgical staff will expend all of their energies.

It is more than probable that future sea fights will be short and bloody, and be fought at short range. With modern rapid-fire guns, all exposed parts of a vessel would soon be cleared of the living occupants and heavy armor would be the only protection. The personal danger confronting the surgeon will be greater than ever before. It will be his object to do the greater good to the greatest number. Except in limited numbers his patients can not be brought to him; he must go to them. He will scarcely ever be able to perform a capital operation during an action; time will not permit. He must be here, there, and everywhere. If he can find a sheltered place anywhere in the ship where he will not be in the way of a gun, a torpedo tube, a trolley, or an ammunition hoist, let him there establish a central station and a line of communication with all accessible parts of the ship. No particular part of the ship can be here designated as this central station; it must vary in accordance with the construction of the vessel. It should be the place where there would be the greatest protection, with the greatest accessibility. In case of a lull in, or immediately after, an action, the wounded should be taken there and such operations as are practicable performed. In vessels where there is not free communication fore and aft, there should be two such stations with at least one surgeon assigned to each. During an action many men will fall in places where, if two or more of their comrades were detailed as carriers, it would disable the fighting force of the gun and give the enemy a greater chance of victory. We must reconcile ourselves to the fact that the primary object of combat is to vanquish your adversary, and must accommodate ourselves to the situation.

Some means of communication, vocal or electrical, should be established between each compartment or fighting space and the central station, so that the surgeon can be informed where his services are required, if the wounded can not be speedily removed. Meanwhile the importance of first aid is clearly manifest. This first aid can only be rendered by comrades. The thorough instruction of the whole ship's company in the efficient manner of thus administering first aid can not be too strongly urged. One of the first duties of the surgical staff of a newly commissioned vessel should be the drilling of the crew in the proper methods of controlling hæmorrhage from different parts of the body, the removal of foreign bodies from wounds, and the placing in proper positions of injured or broken limbs. They should also be taught how to carry a man up or down through narrow hatches, over obstacles, or through contracted or tortuous passages with the least fatigue to themselves and the greatest comfort to the wounded. In many instances it would be impossible to use a cot or any form of stretcher; under these circumstances the only alternative is that the disabled should be carried.

The fighting space allotted, especially in turrets, is so contracted that the immediate removal of a disabled or wounded man is of the utmost importance. There is no unoccupied space in the turret where he could be laid aside, out of the way of the gun workers, until action is over. His presence would temporarily disable the gun. The only practicable method of caring for him is to lower him to the partially cleared space at the base of the turret, either by the ammunition hoist or lashed in a hammock; even here he would only receive temporary aid, as the space is too limited for the performance of any operation. Here he must remain until a favorable opportunity arises for his transfer to the central station.

The equipment of the surgeon and his assistants must be the simplest, and yet the most effective. They will have very little immediate use for anything but brandy, ammonia, morphia, and the requirements for the control of hæmorrhage. With these they can quickly leave the central station for any part of the ship where their services may be required, and superintend the bringing back of the patient.

The simplest method of transportation, and the one causing the least discomfort to the wounded, is a stretcher on which a mattress and pillow have been laid, but there are very few places on a battle ship where a stretcher could be conveniently used. It is inapplicable for narrow or tortuous passages for going up or down ladders, or for getting in or out of small compartments. Where the man is so severely injured that he can not be picked up and carried, or where a stretcher can not be used, the device that is considered best in the United States Navy is to lash and carry him, on the same deck, in a hammock containing a mattress; or for transference from one deck to another by means of the apparatus suggested by Passed Assistant Surgeon Stitt. This apparatus consists of "a bar made of 1-inch iron piping, 7 feet long, with ends forged flat and holes drilled in them; snap hooks are attached to these ends; a binding strap moving freely on the pipes gives the point of support, and is capable of being tightened by a thumbscrew. The object of this is to enable one to raise or lower a wounded person at any degree of obliquity. When the men transferring the hammock reach the hatchway, where one of these stretcher bars is rigged, they snap the hooks into the hammock rings and lower away. The advantages of this method are as follows: Ease and freedom from pain, and improbability of injury during movement along deck; rapidity of passages from one deck to another; any hatchway, however small, can be used; a wounded man reaches sick quarters with his hammock; the simplicity of apparatus, which can be made in a short time on any ship; only two men are required to manipulate and lower it."

The simplicity of this apparatus, as thus described by its inventor, is only equaled by its efficacy in practice. It has now been long enough in use in the United States Navy to place it beyond the stage of experiment and to demonstrate its efficiency.

On the vessels that remain afloat after a modern naval engagement, the decks will be much encumbered with wounded, such first aid as was possible will have been given to them, but their comfort and well-being will by no means be enhanced by retaining them on board the vessel. Naval engagements will not be likely to take place under the lee of a shore hospital, and humanity demands that wounded men shall have speedy transfer to the place where they can be best cared for, and that place can be none other than an ambulance ship. Such a vessel should be as much a component part of a fleet as the admiral's flagship. It would greatly add to the morale of the men behind the guns, when they went into action, if they saw near at hand a commodious hospital, with all the appliances for their care and comfort, and under the superintendence of skilled medical officers. This vessel should be solely and entirely an ambulance ship, with a crew only sufficient to work the ship, and all her available deck room given up to quarters for sick and wounded.

I submit herewith plans of an ambulance ship which has been arranged to include as many conveniences as is practicable in such a vessel. It is primarily a vessel adapted for the care and welfare of sick and wounded men, and all other considerations are made subservient to this end. The vessel as designed will be 3,550 tons displacement; 275 feet on the load line, and 300 feet over all; with twin screws and a speed of 14 knots; 50 feet beam, and drawing 18 feet; a coal capacity of 450 tons, giving eighteen days' steaming at 10 knots. The water tanks will hold 9,000 gallons. The ship will carry 4 steam launches and 4 barges, each barge arranged with a flying floor between the thwarts, so as to conveniently carry 12 cots on the floor. There will be beds for 274, and hammock space for 36. Staterooms for 8 disabled officers, and cot space for 12. The beds for the men are hair mattresses on woven-wire springs, supported by a plain iron framework with corner stanchions. The height of the deck beams being 8 feet, allows 2 tiers of berths. The forward ward on the upper deck has been left with only one tier of berths, for a ward of isolation, or to accommodate more serious cases. The vessel can comfortably accommodate 330 sick or wounded men, with sufficient berthing space for the crew of the vessel. There are quarters for 4 medical officers, 2 apothecaries, and 12 nurses. On the upper deck is an inclosed room, 22 by 24 feet, for convalescent officers, and a room 26 by 35 for convalescent men. On this deck also are the galley, laundry, wash room, drying room, lamp room, closets and bathroom for both officers and men, the office of the senior medical officer and of the executive officer. Dumb-waiters go from the galley to the diet kitchens on the decks below. The upper part of the operating room is also inclosed on this deck.

Near the center of the ship, on the berth deck, is the operating room, 18 by 21 feet. It is well lighted by a large skylight and by air ports above the upper deck. On either side of this operating room is an elevator large enough to hold a cot. The elevator runs from the upper to the lower deck, and is run by electricity. A patient can be hoisted in his cot from the barge alongside the ship, placed in the elevator, lowered to the operating room, and from there transferred either to a bed on the berth deck or lowered and transferred on the deck below. This transfer is accomplished by means of an overhead trolley, which runs from the operating room and the elevator, between the rows of beds, and by means of which the occupant of any bed can be transferred.

On the engine-room deck is an ice machine and cold storage rooms, a disinfecting chamber, Sturtevant blowers, and ample storerooms for all departments of the ship. The ventilation is accomplished by 2 powerful blowers, with their necessary connections, and supplementary electric fans. The vessel is to be heated by steam and lighted by electricity. The constructor has so arranged the model of the hull as to insure the minimum of motion, either in a head or beam sea. There are steam winches on the upper deck for hoisting or lowering wounded or boats. They can be worked on both sides simultaneously.

The outfit of the operating room will include two or three operating tables of the model approved by the Surgeon-General of the Navy. These tables are of antiseptic value; are light and portable, being easily folded and carried to any part of the ship. The floor of the operating room will be tiled, and all of its appointments arranged with a view to strict antisepsis.

As soon as the action is over, a launch should tow its barge alongside a vessel that has been in action, the wounded should be hoisted out and into the barge by means of the apparatus already described. It should then steam with all dispatch to the ambulance ship, unload its human freight, and speed away again on its mission of humanity. In no other way could wounded men be better cared for, or a fighting vessel be more speedily disencumbered and placed again in readiness for battle.

The ambulance ship would of course fly the Geneva Cross flag. As an angel of mercy she would spread her wings alike over friend and foe, mitigating the horrors of war, and hastening the advent of the day that will bring "peace on earth and good will toward men."

REPORT ON THE SECOND PAN-AMERICAN MEDICAL CONGRESS.

By George W. Woods, *Medical Director, United States Navy.*

In obedience to orders of October 15, 1896, I proceeded to the City of Mexico on November 7, 1896, and reported to the president of the second Pan-American Medical Congress, Dr. M. Carmona y Vallé. My duties were completed on the 30th of that month, when I returned to Mare Island, and reported my resumption of duty in charge of the United States naval hospital on the 7th of December.

Over 400 members and delegates were in attendance at the congress, embracing representatives from the United States of North America, Canada, the West India Islands, and the Republics of Central and South America, who crowded the hotels of the capital city, and formed a distinct feature in its thoroughfares and places of resort, those from the United States predominating among foreigners, although of course the delegates from the States of the Republic of Mexico constituted by far the larger number of representatives accredited to the congress.

The session was formally opened at the National Theater by President Diaz on the evening of the 16th of November, the building being sumptuously decorated and illuminated for the occasion, and the crowded assembly was addressed by His Excellency Porfirio Diaz, President of the Republic; Dr. Eduardo Licèaga, secretary of the congress; Dr. Manuel Carmona y Vallé, president of the present congress, who reviewed the history of medical education in Mexico; Lic. José Maria Gamboa, of the Consejo Superior de Salubridad, a most instructive address devoted to sanitary progress; and Prof. William Pepper, president of the first Pan-American congress, who delivered a scholarly addressed devoted principally to matters of public health, and invoking the aid of all the American governments in aid of national and international sanitation.

The day of the formal opening the sections were organized, the headquarters being in the Mineria, the principal place of meeting being in the great lecture rooms of this vast building, but a large number were accommodated in other institutions of the city, most of them at such great distances it was impossible to attend them all and obtain a thorough knowledge of the work of the congress. Every department of medical and surgical knowledge was considered, the work being divided into 15 sections, and I was allotted to section No. 4, "Obstetrics, gynecology, and abdominal surgery," on account of the subject of my paper, "Intestinal obstruction," where I received the honor of being requested to preside at the time of its reading.

The sections were thus divided, viz: (1) General medicine; (2) General surgery; (3) Military, naval, and railroad surgery; (4) Obstetrics, gynecology, and abdominal surgery; (5) Anatomy and physiology; (6) Diseases of children; (7) Ophthalmology; (8) Laryngology, rhinology and otology; (9) Dermatology and syphilography; (10) Hygiene and demography; (11) Mental and nervous diseases and medical jurisprudence; (12) Dental surgery; (13) Medical pedagogics; (14) Bacteriology; (15) Veterinary surgery.

The attendance in the sections was varied by visits to the hospitals, eleemosynary institutions, and points of sanitary as well as other objects of professional interest. Though these visits interfered greatly with attendance on the didactic proceedings of the congress, they added much to our knowledge, while permitting the authorities and managers to demonstrate what great sanitary and scientific work Mexico had done and was still doing, and also afforded large opportunities for studying the topography of the Valley of Mexico, the civilization of her people, the character and features of the capital city, and both her history and archæology.

The programme was as follows, commencing ordinarily at 7:30 a. m., and the sessions of the many sections occurring daily from 9 a. m. to 12 m., and from 3 to 4 p. m.:

November 16. (1) Visit to Museum of Pathological Anatomy and National School of Medicine; (2) formal opening general session in National Theater.

November 17. (1) Visit to the new city slaughter houses; (2) visit to the officers of the supreme board of health; (3) intermediate general session in the evening.

November 18. (1) Visit to the new general hospital, in process of construction at a considerable distance from the city; (2) visit to the new penitentiary, just completed; (3) an evening reception by the municipality.

November 19. (1) Reception by the President of the Republic at Chepultapec; (2) closing general session.

November 20. Visit to the drainage works of the Valley of Mexico.

November 21. Visit to the ruins, pyramids, and monuments of San Juan de Teotihuacan, distant 60 miles from the capital, and reception at the hacienda of the governor of the State of Mexico, El General Don José Vicente Villada.

Much time was spent in inspecting the various hospitals; the National Museum; the National School of Fine Arts; the National Library; the various educational institutions, including the National Medical Institute and the Supreme Board of Health, with all its interesting work, embracing every branch of sanitary investigation, including disinfection, bacteriological study, and inoculation for rabies; the Hospital for Military Instruction; Deaf and Dumb Institute; and the Pauper Asylum.

The interest for medical men, and especially sanitarians, centered in the visit to the drainage works, which have for their primary object the drainage of the lake region of the great Valley of Mexico so as to prevent inundation and insalubrity from the overflow of its chain of lakes and rivers during the rainy season, and, secondarily, to dispose of the sewage of the great city, one of the most stupendous projects ever instituted and carried to completion by any government. This was the dream of the earliest viceroys, one of whom executed the colossal cut of Nochistongo, which meets the traveler not many miles from the gateway of the city, still useful in carrying off the waters of the Cuantitlan, and during the period of succession, through various later Spanish representatives and Presidents, the same ambition has continued, looking forward to its final fulfillment.

The great work was finally commenced at an uncertain date between 1850 and 1875, was suspended and resumed many times during this quarter of a century, but not seriously continued until 1879, under the engineer, Don Luis Espinosa, which was again interrupted, but in 1885 work was renewed with energy, and the Federal Government came magnificently to the aid of the State of Mexico, which provided annually $400,000, and by a Federal loan, placed in London, obtained £2,400,000, which was nearly all turned over to the commission, and to this was added a certain amount of Federal taxes. Since that time the work has gone on steadily, without serious interruption, under the management of a special commission, and is now on the eve of completion, with all its great cost—about 400,000,000 pesos—practically paid.

The system of drainage embraces a grand canal and tunnel, lined with brick and stone—numerous working shafts being left as ventilators—which traverse the valley from the gate of San Lazaro, communicating with the Lake of Tezcuco, the lowest in the valley, also receiving water from all parts of the great basin, and is of a capacity to control the largest quantity of water ever to be demanded of it, with a flow of 18 meters per second. The natural filtration from the soil is so abundant as to produce a flow of nearly 3 meters per second for many months in the year.

The excavations have been made through calcareous formations, clay, and alluvial soil, and the tunnel has a total length of about 10,000 meters, connecting finally with water courses at its outlet from the valley, practically terminating in the Tampico River, and has been the work of American, English, and native contractors, with dredges and hand labor. Besides the enormous earthwork, 3 aqueducts, 2 road bridges, and 1 iron railroad bridge were erected, and the whole may be said to have been practically completed in July, 1896. By means of this canal the sewage is to be carried from the city, and immense pumps are to be at once erected, which will raise and force the sewage into the water current, and with this arrangement of pumps a perfection is promised in the sewerage system of the capital city and its environs.

The New Hospital, in process of construction; the rastros, or new city slaughterhouses; and the new penitentiary—the latter two about completed—challenge comparison with those of the great cities of both Europe and America, while the work of the supreme board of health is wide in its scope and perfect in every detail.

The hospitals of Mexico are mostly remodeled monasteries and convents of great age. They are more or less insanitary—all save the Military Hospital—and in consequence the large and modern structure now nearing completion has been demanded. It is located in a charming and salubrious suburb of the city, is built on the pavilion plan, and will cost $250,000. The plan embraces 35 one-story pavilions, 24 of which are wards, constructed of iron and stone on brick and concrete foundations—the floors only being of wood—and separated by beautiful gardens. The furniture comprises iron bedsteads and chairs, tables of iron and glass, and utensils of enameled iron. The wards are arranged in 2 wings, perfectly lighted and ventilated, each wing having accommodations for 16 patients, making a total capacity of 760 for the whole hospital, capable of increase by the building of additional wings.

The American Hospital, which was also visited, is an honor to the American colony supporting it. It is small but perfectly equipped, and is under the control of Dr. Alfred Bray, a clever surgeon and physician, who attracted much attention during the sitting of the congress by exhibiting and demonstrating two new alkaloids obtained from a native Mexican plant, one a mydriatic, the other a local anæsthetic similar in its effects to cocaine.

The hospital is located in beautiful ornamental grounds, the wards are airy and well furnished, while the armamentarium was found so complete and the operating room so perfect in all its appointments as to elicit expressions of the warmest commendation from everyone.

The hospital was built under the auspices of the American Benevolent Society, of which the United States minister is honorary president, at a cost of about $70,000, and had its commencement in a fund contributed by a party of tourists in 1885, one of the number having died in a hospital after a lingering illness. It is supported by generous contributions from the American colony resident in Mexico, payment from those patients who are able to pay, and the proceeds of an annual charity ball.

The supreme board of health is a powerful organization, having the patriotic and zealous support in every particular of the President of the Republic and the secretary of the interior. It has cognizance of all city, country, street, and dwelling sanitation, including public buildings, churches, schools, and theaters, of all trades and forms of business, markets, prisons, hospitals, asylums, cemeteries, the practice of medicine, military hygiene, epidemic disease, vaccination, bacteriology, public works, and judicial questions, quarantine, and analyses of foods—a large field, but well covered by a small army of most competent men, located in every portion of the Republic, and includes a Pasteur department, where inoculation for rabies is practiced.

It has control of an elaborate disinfection service in the capital city, based on the French system, established in 1889. This comprises a collection service, with disinfection by means of superheated steam, in a Geneste-Herscher stove, of all clothing and bedding associated with each case, and a return of the same to the domicile, with also a thorough disinfection of the dwelling where the disease exists or has existed. In the apartment of reception all clothing and bedding is cleansed in an antiseptic solution, introduced into a cylinder with tightly closing doors at either end, where it is submitted to the action of superheated steam or air, and after a definite period the apparatus is slid into another apartment and the contents of the cylinder removed. Closed wagons, painted yellow, transport the clothing to the disinfecting plant, and others, painted maroon, carry it back when disinfected and roughly laundered or dried.

Medical education has received great attention throughout the Republic since the year 1733, and since 1770 there has been a medical school in association with the universities of Mexico and Guadalajara, which antedates that of our own University of Pennsylvania; but the central Escuela de Medicina, through many governments and administrations, had a fluctuating and itinerant existence in various condemned religious edifices until 1854, when it was finally located in the old Inquisition Building, formerly the Seminario Conciliar. Since 1867 it has been specially cared for by the General Government and the various governors of the State of Mexico, a large annual subsidy being granted by the State, with special modest salaries for the director, secretary, and professors.

Preliminary academic acquirements are exacted from all matriculants, and the course of study is about the same as in the medical schools of the United States, covering a period of five years. The attendance is large, and the clinical advantages are abundant, but many supplement their local course by attendance on American and European colleges. The practitioners of Mexico are to be classed with the most advanced of any country. A large library is connected with the school, and a museum of pathological anatomy, under the control of Prof. Rafael La Vista, vice-president of the congress. To the museum we made an official visit, where we were shown not only a most valuable collection of models and wet and dry preparations for the illustration of lectures, but a great number of freshly prepared specimens of peculiar interest, displayed on marble slabs, which an attendant kept constantly freshened with an antiseptic solution. Those which attracted our special attention were cases of hepatitis, hepatic abscess, and a peculiar form of cirrhosis, the result of pulque drinking, a case of diphtheritic colitis, and a unique case of cysticercus of the brain.

A recent organization, composed of the most eminent men of science of Mexico, supervises in some degree medical education and allied studies, and devotes special attention to hygiene, medical geography and climatology, natural history, botany, particularly medical botany, experimental biology, and bacteriology. It is denominated the Medical National Institute and dates only from 1888, but during that period has published each year a series of annals of extreme value, its labors in the classification of those plants constituting the medical flora of Mexico and their therapeutic application. For the purpose of this study an experimental botanical garden has been established, which is rendered most attractive by trees, shrubs, and plants, both common and rare, of native and foreign origin, and to the congress made still more interesting by an exhibit of herbaria and demonstrations of preparations for medical use.

I visited the Military Hospital and School of Instruction, in the Plazuela de San Lucas. In all particulars it is a model institution, its operating rooms being among the best I have ever inspected, its armamentarium large and perfect, and its construction, furniture, lighting, and hygiene everything that could be demanded.

For illustration to its pupils and exhibition to the members and delegates of the congress, a hospital camp was erected in the patio of the hospital, embracing tents, ambulances, stretchers, and all appliances for transportation and temporary care of the sick and wounded, based evidently on the organization of continental service, especially that of the French army.

At the Hospital of San Andreas I had the privilege of witnessing an operation by Dr. Frank, of Chicago, upon a dog, for the purpose of demonstrating his mode of procedure for anastomosis of the intestine, which is intended to overcome the objections to and to be a substitute for the "Murphy button." The device is very simple, being composed of two plates of decalcified bone, which are placed over a rubber drainage tube. The ends of the intestine are brought together over this arrangement, the bone is absorbed in about three days, leaving the flexible rubber free, which is discharged through the intestine. On this occasion, after a laparotomy, 4 inches of the ileum were removed and anastomosis affected, the operation being completed in fourteen minutes. Twenty-eight hours later the complete success of the operation was demonstrated on reopening of the abdomen, and by the passage of the elastic tube.

The final session of the congress was held on the evening of the 19th of November in the Camara de Diputados. The next place of meeting was decided to be Caracas, Venezuela, in the month of June, 1900.

When the translation of the proceedings of the congress is received, I shall supplement this report with a review of the various papers, which may be of interest to the medical department of the United States Navy.

INTESTINAL OBSTRUCTION.

By George W. Woods, *Medical Director, United States Navy.*

I commence this paper with the report of a remarkable case, ending fatally, which had such a peculiar origin and so many strange features during a period of years, that it must claim, I think, your interested attention. I offer this case not only for its elements of unique character but because of its arousing my interest in laparotomy for the relief of conditions of obstruction, and inducing me not only to carefully observe a series of operations in the Orient, but to analyze modern clinical reports bearing on the subject with a view to determining—

First. What are the most common forms of intestinal obstruction? Second. What forms are likely to be relieved by medical treatment alone and admit of delay for this purpose? Third. What forms imperatively demand surgical treatment? Fourth. Diagnosis. Fifth. A consideration of the subject of exploratory laparotomy with a view to emphasizing the comparatively small danger attending it in these days of perfect operative technique, anæsthetics, and antisepsis; endeavoring to present in a brief form, likewise, a general review of the subject, our present status of knowledge, the views entertained by those in favor of operative procedure and those opposed to it, and, I trust, demonstrating that the consensus of opinion at this period is, without important dissent, in favor of early operation in all cases admitting of any doubt as to the curative possibilities of the usual nonoperative treatment.

The following case, with which I was associated from 1886 until it ended fatally in June, 1895, presents features of such unique peculiarity and interest that I am led to consider it as the most remarkable which has fallen under my observation in the course of my professional career.

The subject of it was an apprentice boy who, while attached to the U. S. S. *Alaska* in the summer of 1884, and on liberty at Callao, Peru, was stabbed in a general row between Peruvians and foreign seamen, the knife or dagger entering a lower posterior intercostal space in the axillary line and ranging downward and inward. Traumatic pleurisy supervened and empyema, and patient was transferred to the naval hospital on the arrival of the ship at Mare Island.

At the hospital he remained some months, and when discharged had so far recovered as to accept employment with a street railway company as the driver of a horse car. While thus engaged he sustained a compound fracture of the humerus, and on recovery from this accident entered my employment at Mare Island, where he studied pharmacy, and was subsequently appointed an apothecary. He was then in fair health, ruddy and rosy, having, however, a chronic cough, and the abundant sputum caused me to denominate it a branchorrhœa.

In 1890 he developed symptoms of phthisis in both lungs, with hectic fever, and from this date began to emaciate and lose the hue of health. Simultaneously he had excruciating pain in the left lumbar region and commenced the use of morphia, which became a necessity to him, the habit thus established, continuing through the remainder of his life. This region was aspirated and a considerable amount of pus removed, the cavity closing up and healing after several months, though pain never entirely ceased. In 1893 a swelling appeared in the left groin, which was pronounced by a medical officer to be hernia, and the patient was sent to me for examination. I pronounced it to be a psoas abscess, and believed it to be but a continuation of the processes above, the pus gravitating to this lower point. On opening it, pus flowed freely and continued to drain away for a long period, eventually closing. Pain, however, he claimed to be constantly present, that the use of morphia was not only kept up, but the quantity of the drug so augmented that at this time he was taking 15 to 20 grains per day, and in consequence he exhibited all the manifestations and conditions of the victim of the morphia habit to which were added those of cocaine, which he also used in large quantities.

The last phase of this case was when he was admitted with peritonitis (?) to the naval hospital, Mare Island, Cal., on March 17, 1895, his hospital ticket practically stating "that he had intestinal obstruction, producing colic, the obstructive condition probably being due to bands of adhesion related to an old peritonitis."

The pains were intense, and the amount of morphia was continually increased to give relief. Calomel and ol.recini acted, however, so perfectly in cleansing the bowels and expelling flatus, that after forty-eight hours patient seemed convalescent, and it was considered a good opportunity to reduce his daily allowance of anodynes, and attempt a cure of this pernicious habit. The system, instituted and maintained with difficulty and great opposition on the part of the patient, from the 20th of May to the 2d of June, was fairly successful, but on that date the colicky symptoms returned, and no treatment seemed to overcome the obstinate constipation; the pains, now that no anodynes were given, being excruciating, and the stomach very irritable.

On the 12th of June he was extremely weak and suffering from singultus. On the 13th nauseated, abdomen swollen and tympanitic over ascending and transverse colon, and in the evening of that day and on the morning of the 14th there was stercoraceous vomiting. The absence of tympanitis over the descending colon showed the obstruction to be at the point where the transverse colon becomes the descending, the originally located seat of trouble, and an operation seemed to be imperatively demanded. So, after consultation with my medical associates of the hospital and station, it was determined to operate without delay. In preparation for the operation, morphia was hypodermatically given before the administration of the anæsthetic, and when well under the influence of the latter an exploratory laparotomy was performed. The complete details of the operation—conducted under strict antisepsis—are unnecessary. Suffice it to say that although the gut at the point previously diagnosed as the seat of obstruction was found to be matted and held by organized lmyph, which was ruptured, no stricture could be demonstrated here or in course of descending colon; and, as patient was evidently sinking, an artificial anus was hastily formed and the abdomen closed after thorough antiseptic cleansing.

At the moment of concluding the operation the patient, however, suddenly passed into a state of complete collapse, and although every means was employed to revive him, he died on the table.

The revelations of the autopsy are of intense interest as illustrating the lengthy development and strange pathology of this case, and I quote the report in full:

> All the intestines found to be distended except the descending colon, which was empty. At the point where the transverse becomes the descending colon, the seat of matted bands of lymph, the large intestine was found adherent to the diaphragm, and on dissection the colon was found to project through a traumatic opening into the thoracic cavity, so by the flexion and adhesion of the intestine the caliber of the gut was almost obliterated. An old abscess was found in the erector spinæ muscle, with a posterior opening, which had completely disintegrated this muscle of the left side. The left lung was adherent throughout its entire extent, and the right in its upper portion, and small vomicæ were found in both lungs with much tubercular deposit.

The scar of the stab wound, the origin of all the trouble, was found low down, posteriorly, in the left axillary line nearly corresponding to the opening in the diaphragm. There is no doubt that the wound involved the erector spinæ muscle, the diaphragm, and sheath of the iliacus muscle, which, at first, healing, subsequently reopened, permitting the purulent contents of the pleural cavity to penetrate the muscular substance of the erector spinæ and sheath of the iliacus, and by distending pressure enlarged the diaphragmatic opening, thus permitting a hernial protrusion into the chest.

Intestinal obstruction is of course any condition which mechanically prevents the passage of intestinal contents, but it is more conveniently studied as apart from strangulated external herniæ, and, even in this restricted sense it is a subject embracing a most extensive consideration of pathology and anatomical structural relations, presenting, even in its simplest forms, obscurities and difficulties of diagnosis, and is characterized, where neglected or not wisely considered, by the extremest perils in medical and surgical treatment in either its acute or chronic forms. Its frequency is greater than is generally admitted, Hensen calculating that out of every 100,000 individuals 5 to 10 suffer from the affliction, and 1 in every 300 to 500 deaths is attributable to this cause. The Guy's Hospital records of fourteen years show that one-fourth of 1 per cent of the deaths were attributed to intestinal obstruction.

The most important division is into the acute and chronic forms, the first being abrupt and alarming in its onset and due to some narrowing of the lumen above the ilio-cœcal valve; and the second, a condition of gradual development and generally belonging to the period of advanced age, though the chronic may develop into an acute stage.

Of the acute forms we have as a common enumeration:

First. Congenital conditions, as constrictions or malformations.

Second. Foreign bodies introduced through stomach, or formed in the intestinal tract, or gall bladder, and discharged through the duct or by ulceration.

Third. Volvulus, twisting or displacement of bowels, both large and small intestines.

Fourth. Internal strangulation by loops, bands, false membranes, diverticula, mesenteric pouches, slipping of portion of intestine into any opening, natural or otherwise, diaphragmatic or mesenteric herniæ, etc.

Fifth. Invagination, caused by worms, polypi, long mesentery, enteritis and colitis, etc.

Of the chronic conditions as a cause, we have:

First. Fæcal impactions, as a sequel of constipation, and often the result of lead poisoning, and adynamic or paralytic conditions.

Second. Stricture of the bowel, often cancerous or due to ulceration and general inflammatory condition.

Third. Compression of the bowels from tumors, either morbid, malignant, or tubercular.

Fourth. Contraction of bowels from inflammatory changes, often tuberculous, causing thickening of intestines, or compressing bands, and diverticula, frequently resulting from operations on the pelvic viscera.

These conditions may occur at any age, but in middle life chronic constipation and obstruction from gall stones and morbid growths are most common, and in advanced life thickened intestines with constrictions are most frequently encountered, while invagination belongs to childhood or youth.

The following table gives a summary of recent and important statistics as to the causes of intestinal obstruction, derived from widely various sources of record and based on clinical reports of 660 cases, embracing eight principal conditions:

Volvulus	65
Bands	237
Fæcal impactions, foreign bodies, etc	56
Tumors	82
Stricture	47
Matting together of intestinal coils from peritoneal and cancerous disease, producing constrictions	23
Intussusception	149
Mesenteric hernia	1
Total	660

From this aggregate record it will be seen that 36 per cent of all cases have had the obstruction in the form of a constricting band, and the result of either idiopathic peritonitis—very rare—or traumatic inflammation following operations on the pelvic viscera, demanding secondary laparatomy; and next in order of frequency come intussusception, tumors, volvulus, fæcal impaction, stricture, and inflammatory matting together of intestines, which is but another form of band constriction.

This leads me to the second consideration of the subject: What forms are likely to be benefited by medical treatment alone and admit of delay? But before this is presented the subject of diagnosis must be reviewed.

An eminent writer on the subject of intestinal obstruction a number of years ago made the statement that "the advances in operative surgery have outstripped those of diagnosis," and it is as true to-day as then, when we find ourselves in the earnest endeavor to make a correct and unimpeachable diagnosis, confronted with equally insurmountable obstacles. It is now, as ever, a condition of mysteries, rendering the surgeon often well-nigh desperate in his efforts to come to any satisfactory conclusion in which he can be assured that all error has been eliminated.

The symptoms common to all cases of intestinal obstruction, whether acute or chronic, are localized pain, vomiting, constipation, and abdominal distension, with, finally, collapse. There is rumbling in the intestines, with a constant desire to go to stool, nothing passing save wind and lumps of indurated fæcal matter coated with mucus and blood, when the obstruction is not absolute.

The vomiting is most distressing, eventually becoming stercoraceous, and if relief does not come, the patient fails rapidly or gangrene and peritonitis supervene, and the case becomes chronic, with death in a state of collapse.

These symptoms belonging to the acute form almost exactly correspond to those of strangulated external herniæ, which condition must first of all be eliminated, and in succession every other possibility must be carefully considered, for which the accompanying diagnostic table may be found useful, which is but an enumeration of the different forms of obstruction, with the principal symptoms pointing to these special conditions and an attempt at analysis. It seems fairly clear and definite, but I fear it may not be found so lucid, being face to face with the real emergency, when we may simply be able to determine whether the condition is an acute one demanding action, and immediate action, or death must speedily ensue, or, on the other hand, admitting of some delay or procrastination; in all cases being guided by a careful review of clinical experience and study of the case, exercising supreme judgment and calling to one's counsels all that can be obtained of trained talent within the radius of one's professional associations, for under no circumstances is a consultation more imperatively demanded.

From a careful consideration of the subject from every point of view, and study of a diagnostic table, we should be able to make such a decision as will eliminate with comparative certainty all obstructions save those due to peritoneal bands, loops, matted coils, mesenteric and omental herniæ, and volvulus, which generally defy positive diagnosis under any circumstances.

The second inquiry may now be presented as to what forms of obstruction are possibly to be benefited by medical treatment or manipulation, at least temporarily, and they are:

Acute.—Volvulus, strangulation.

Chronic.—Fæcal impaction, lead poisoning, adynamic conditions, cancer of rectum.

The third consideration as to what forms generally demand surgical treatment may be answered:

Acute.—Gallstone impaction, foreign bodies, calculi, etc., volvulus, peritoneal bands, loops, slits, and diverticula, etc.; intussusception.

Chronic.—Strictures, cancer of rectum, congenital conditions, neoplasms.

The fourth consideration is, What forms admit of, at least, brief delay only, while employing medical or mechanical measures before resorting to operation? These are:

Acute.—Volvulus, intussusception, foreign bodies, calculi, etc.; internal herniæ.

Chronic.—Neoplasms.

Fifthly. What are those conditions in which time spent in tentative, or experimental measures, is generally a dangerous delay? To which we answer:

Acute.—Volvulus, peritoneal bands, etc.; forms of internal herniæ.

And, sixthly, we consider the subject of diagnostic examination.

We must first assure ourselves that an obstruction exists and determine whether the case is acute or chronic, the latter admitting most generally of delay, and the former immediate attention and rapid decision.

We perceive that a satisfactory diagnosis can be made out in a fair proportion of cases—volvulus the single great exception—and "for practical purposes," Professor Fitz says, "we may conclude that we have a volvulus of large intestine, a strangulation or impaction in small intestine, either gallstones, foreign bodies, enteroliths, or fæcal matter."

That if pain is acute and course rapid, the vomiting early and severe, and abdomen quickly distended, with urine scanty, and indican in excess, the small intestine is involved; while constipation, slowly developing tympanitis, vomiting a later symptom or not at all, and pain subacute, with constitutional symptoms not profound, point to chronic obstruction, and generally of large intestine.

In making the diagnosis, investigation and exploration should carefully determine the presence or absence of fever (peritonitis, local or general), abdominal tenderness, localizing it, localized pain or tenderness complained of by patient, or any seat of distress being most important, especially in intussusception.

Examination must also be made of rectum and sigmoid flexure and the whole of large intestine, by enemata of water under pressure, or insufflation of hydrogen gas or air, and in doing this patient can generally determine the point which is reached by the fluid or gas.

Professor Fitz states that the capacity of the colon should be determined under anæsthesia, and is generally about 6 quarts, and that in its exploratory as well as therapeutic use the column of water should have a height of 20 feet for adults and for children 6 feet, and should be employed early, before intestinal gases accumulate.

The extremity of the intestinal canal, from anus to sigmoid flexure, must also be explored digitally, or by means of rectal elastic bougies, stiffened, if need be, by wires, this being the chief seat of strictures and carcinomatous growths. In this seat of disease the rectal instruments of Kelly will be found of great service.

Unless a positive diagnosis can be made out of a mechanical obstacle impossible to be overcome, the instructions usually are that patient should be quieted with anodynes, allowed no food and but little drink, and if relief is not quickly obtained, should be anæsthetized and copious warm enemata of water or oil continuously administered through a long tube, with patient in a position to insure an upward current of the injected fluid. This may be repeated many times, being supplemented by the mildest laxatives, such as castor oil and sulphate of magnesia. This treatment should alternate with full inflation by air or hydrogen gas—most valuable in intussusception—and massage must be employed. If nausea and violent peristalsis exist, lavage of the stomach, as recommended by Kussmaul, often gives remarkable relief. This treatment should be alternated with the massage, or taxis, which may be of even a somewhat violent character, the body being tossed around and even inverted, with a view to relieving invagination, displacements, the constriction of bands, omental or other internal herniæ, aided by repeated injections, always to be made with the pelvis elevated; and as a further aid to relaxation and relief of pain an occasional inhalation of some anæsthetic may be given, and belladonna ointment applied by inunction to the abdomen, to which hot fomentations may also be applied, or hot poultices, one of hops being very grateful.

During this period of active effort food and drink should be prohibited, save in small quantity, beef tea and cracked ice with a little brandy being preferred. Painful meteorism may be relieved by puncture with a small trocar and cannula; and the administration of metallic mercury has been much lauded, especially in the intussusception and volvulus, but purgatives are condemned by all practitioners.

Opium and laxatives and electricity are especially commended in gallstone impaction.

The usual advice is not to continue this treatment beyond three days, and not so long if patient obtains no relief from symptoms. In 13 cases, however, recently reported by Sajous, the average time elapsing before operation, after development of symptoms, was $5\frac{11}{13}$ days, and in one case twelve days, an exceptional period, considering the successful results reported. On the slightest signs, however, of a tendency toward collapse, at any period, patient must be revived with morphia and stimulants, and a surgeon summoned, or consultation demanded, with a view to laparotomy.

This is the status of medical treatment up to and within the present period, embracing catharsis, injections, taxis, and manipulation, which are adapted to all chronic cases, and to acute cases in the earlier stages, until the period arrives when a diagnosis can be perfected, or these tentative therapeutic measures which have been employed, are found to be useless and mechanical obstruction incapable of being overcome is unquestioned; then, without delay, an exploratory laparotomy *must* be performed, for which life-saving operation every physician should be prepared and able to assume the rôle of surgeon, as he should be ready on imperative demand to make a tracheotomy, a herniotomy, or an arterial ligation.

Its advocates emphasize persistent medical and mechanical treatment as a duty, when, by pursuing it for a *reasonable* time—and in the interpretation of the term *reasonable* lies the danger—with a view to avoiding operation, the patient's safety is not thereby jeopardized, supporting their opinion by reference to many cases. apparently hopeless, which have recovered under the designated or similar treatment; and, although modern surgery has only reduced the mortality to 70 per cent of all cases, *without* surgical interference it is placed at 95 per cent. With these convincing statistics—which are becoming more favorable yearly for the advocates of operation at an early stage, recently being put at 58 per cent—what wonder that Tréves, the Nestor of the subject of intestinal obstruction, should say, "Laparotomy is the only curative measure;" or that Greig Smith should echo his words, and add the emphatic opinion as to the majority of acute cases, "Operation is indicated as clearly as when confronted with a bleeding carotid."

Of course some treatment must be instituted and pursued with a view to the happy accident of relief, or while an attempt is being made to perfect a diagnosis, but such instructions as "do not operate until the third or fourth day," "continue treatment and taxis persistently for thirty-six hours," are misleading and a fatal wrong to the patient. Such procedure as is instituted must be emphasized as brief, and, if no relief follows, save in cases of extreme chronicity, should not be extended generally beyond the hour, certainly not pursued for more than a few hours.

These remarks lead to the seventh and final consideration, laparotomy as an exploratory or diagnostic measure, which may be extended so as to expose the whole field of operation and give the opportunity of relieving any obstructing condition within the abdominal cavity.

Senn says "from the beginning, all cases of intestinal obstruction are surgical and should be considered in the same light as external strangulated herniæ," and, while recommending irrigation of stomach, gaseous and liquid injections, taxis, and massage to a moderate extent in first stage, enjoins operation when positive or approximate diagnosis can be made out or treatment gives no encouragement. This is the best advice and what modern surgery teaches.

In addition, we have the authority of nearly every modern surgeon, almost without exception, that exploration of the abdominal cavity, with proper antiseptic precautions, is attended with little danger—absolutely none—superadded to pathological condition, save when fatal delay has preceded the operation. So nearly universal is this opinion that to give supporting testimony it would be necessary to mention almost every man of surgical eminence in the wide world.

A recent eminent writer, recording a fatal case of compression by bands, brought to him too late—information of the pathological lesion being obtained post-mortem—writes thus: "In so many cases delay means death; and yet the danger of exploratory incision is infinitesimal, comparatively simple in the early stage, before inflammation is established, when the finger or even the hand can be freely passed around the abdominal cavity without impediment or embarrassment, caused by distention or stickiness, and the operation completed in a few minutes, preventing the necessity later of an enterotomy." And again, "In laparatomy we endeavor by an intelligent cooperation of brain and sense (1) to discover the lesion, and (2) to remedy it. When the operation fails, it is generally due to one of the following causes, viz, (1) delayed interference; (2) pathological conditions irremediable from the first; (3) inability to discover the lesion—a not very common occurrence."

On the other hand, there is still a large school of general practitioners in all countries opposed to operative procedure in these cases, and even the eminent Joseph Hutchinson, of London, a man of vast experience, great skill, and abundant success, says "he would be inclined to let the few go rather than interfere surgically, even in the forms of external herniæ." So confident is he of the fatal character of abdominal surgery for the relief of obstructive conditions, believing that the risk to life is thereby augmented, he concludes that "if it should ever become the common practice to operate early, without exhausting all other means of relief, the fatality in these cases would be greatly increased," or words to that effect.

Dr. Hutchinson advocates, after an experience of twenty-three years in the London hospital, taxis in all cases of external hernia and internal obstructions, and "*forcible* taxis" at that, with vigorous abdominal manipulation, inversion, rolling of body, and enemata.

He does not oppose laparotomy when the operation is unquestionably demanded, but objects to too early a decision in favor of the knife, as, in his experience, the most acute and alarming cases often get well without operative interference. He regards "intussusception as the only precise lesion which can positively be determined, and the diagnosis of all others must be admitted by every candid surgeon to be an utter impossibility."

We can accept Dr. Hutchinson's restricted limit to our powers of diagnosis, but clinical reports do not sustain his faith in medical, mechanical, and associated treatment alone, nor do they give the same exceptional story of success as in his London experience.

From the earliest period of medical and surgical record, at least from the time of the ancient Greek schools, there has been a want of satisfaction with anodynes, fomentations, enemata, inflation, and the employment of ancient and time-honored methods, such as version and various forms of rough manipulation, which have been the source of cruel disappointment, so that, even before the dawn of surgery, in our modern sense, centuries before the Christian era, an inspired Greek advised an abdominal section for the relief of what was classically termed the "iliac passion," but we have not the history of his counsel being heeded.

In modern days, almost within our own period, at the time of the French Revolution, when abdominal surgery, as we accept and understand it, did not exist, a young French surgeon backed up his opinion with action, and actually performed a successful abdominal section for intussusception, saving the patient. Let us do honor to this pioneer, and record the name of Bonnet as the first laparotomist in surgical annals.

Not many years later, just before the beginning of this nineteenth century, a wonderfully endowed surgeon of these United States, who thought for himself and put his grand and original ideas into force, Dr. Ephraim McDowell, of Danville, Ky., successfully performed the abdominal section for ovarian tumor, and ovariotomy became an accepted operation for disease of the ovaries, the greatest boon ever accorded surgically to the female sex. Its importance, however, was not fully realized or its practice established for more than fifty years, but early resort to this operation is now the invariable rule in these later days of the century, and the mortality has been reduced to 5 or 10 per cent.

Pollock, writing twenty-five years ago in that great though somewhat venerable encyclopædic work, Holmes' System of Surgery, urges early action when operative interference is demanded in obstruction of the intestines, and claims failure to be due to waiting too long, until peritonitis is established. He says "the wound of the peritoneum is the minor evil; that it is not the operation which destroys life, but that when a patient suffering from obstruction dies, after operation, death is more probably the result of peritonitis produced by the obstruction, than to be attributed to the effects of the knife;" an opinion in advance of his times, but soon to be heeded, for this was the period of the advent of that great man to whom we owe the so-called practice of "Listerism."

It must not be forgotten that to him with whom this term is associated we owe our ability to perform the operations of abdominal surgery with safety and efficiency—primarily, to our possession of anæsthetics; and secondarily to the teachings and example of Joseph Lister, F. R. C. S.—though perhaps this great benefactor might be conceded the first place—to whom all do honor save a small minority lagging behind in the triumphal march of surgical progress.

Even with the safeguards of asepsis and antisepsis, the opening of the abdominal cavity, however, must not be considered a trivial matter, and save as a necessity it should be in the hands of a skilled operator, though not to be avoided because of want of experience in this generally denominated specialty.

The case being conceded to be a serious and alarming one, let this be our practice. Anæsthetize the patient, make a careful examination of rectum and abdomen, employ the means pointed out as proper therapeutic and mechanical treatment, and if a diagnosis can not be determined as indicating a condition of safety, or the vital powers are being threatened, operate without delay, being assured that a continuance of such treatment without relief must be prejudicial to the patient, diminishing the chances of benefit from operation, remembering that the weight of evidence, experience, and advice is on the surgical side; that gynecologists, with their overwhelming experience, deny that abdominal section is of itself dangerous, which is clearly proven by the trivial mortality recorded in their countless operations; and we have, therefore, the right to conclude that operation for the relief of intestinal obstruction is in no sense a graver surgical procedure than those of the gynecologist, which he encounters daily, and its greater mortality is due to the fact that the rule, or practice, has been to wait too long before performing what Jacobi calls "the timely operation," when it is the only rational course to pursue. Most probably a patient was never wronged by too early an operation, while our clinical records are startingly crowded with cases wherein we read those saddest of words, "too late."

SANITARY NOTES RELATING TO HONGKONG.

By Joseph G. Ayers, *Medical Inspector, United States Navy.*

The island of Hongkong is about 9 miles long from west to east, is from 2 to 5½ miles wide, and consists almost entirely of a broken range of lofty hills and detached peaks, the formation being granite, with steep slopes extending to the sea along most of its coast, there being but little area of level surface.

The highest of the hills is Victoria Peak, at the western end of the island, 1,809 feet above the sea, on the northern side of which is the city, extending far up the steep slope to the foot of a lofty cliff.

The view from the harbor is striking and picturesque, the precipitous face of the peak rising abruptly over the town.

Within a few years a new suburb has sprung up, from the necessity for a cooler and healthier quarter of residence in summer, on the eastern flank of Victoria Peak and the neighoring hills at an elevation of about 1,200 feet, which is remarkable for its rugged scenery and the better climatic conditions than found at the sea level, there being full exposure to the southwest monsoon and a cooler and purer air.

It is connected with the city by a cable tramway over a very steep ascent to Victoria Gap, and has good roads, some built at great cost, winding in and out among the hills. Here, as well as in the city, the wickerwork chair of bamboo and rattan, carried on elastic poles by coolies, forms the general and very pleasant means of conveyance.

Over a wide region, which offers fine views of sea and land, are scattered numerous residences, some palatial, placed on hills and ridges, or at the verge of cliffs, in spots which a few years ago would have seemed inaccessible.

The hill district has a church, hospital, sanitariums, and good hotels. All structures are of brick and stone, and solidly built, to withstand the violence of gales and typhoons.

Since our visit the Government has acquired the Mount Austin Hotel, on the Peak, for use as a sanitarium for the army. This is very large, with a capacity for several hundred guests, and is a fine structure.

Hongkong is within the influence of the monsoons, the southwest monsoon prevailing from May to September, attended with an exceedingly hot season, and the northeast monsoon from October to April, the cool season.

July and August are the hottest months, with a range of temperature from 80° to 94° F., or even higher, and of 10° between day and night, the full strength of the monsoon not being felt in the city owing to its leeward position. The wet season lasts from May to the beginning of August, rains being heavy and without much intermission, frequently causing floods which do much damage.

In 1889 there was a remarkable downpour of rain, "consisting of 33.11 inches from 3 a. m. on the 29th May to 5 p. m. on the 30th, thirty-eight hours in all, which washed down great quantities of alluvial soil from the many landslips on the hillsides, and undoubtedly must have set free the malarial poison to an abnormally great extent, or in a more violent form than had existed for some years." (Atkinson.)

Thunderstorms are not infrequent and are often accompanied by hail.

From the years 1853 to 1891 the least annual rainfall was 59.72 inches and the greatest 120.66 inches, the annual mean being 90.17 inches.

The period from November to January is the coolest, when the air occasionally falls below 40° F., and ice forms, although rarely, on the Peak, and even at the sea level. During the cool season there is much fine weather, and the climate is agreeable. March and April are rainy and foggy. The Peak district is very subject to dense fogs, which gather at the higher altitudes, while the air of the city and harbor is clear.

The above facts as to climate have been gathered chiefly from the China Sea Directory.

The following table is from the report of Dr. Atkinson, 1897:

Meteorological observations for five years registered at Hongkong Observatory.

Month.	1892.				1893.				1894.				1895.				1896.			
	Mean temperature.	Mean humidity.	Sunshine, total.	Rainfall, total.	Mean temperature.	Mean humidity.	Sunshine, total.	Rainfall, total.	Mean temperature.	Mean humidity.	Sunshine, total.	Rainfall, total.	Mean temperature.	Mean humidity.	Sunshine, total.	Rainfall, total.	Mean temperature.	Mean humidity.	Sunshine, total.	Rainfall, total.
	°F.	*P. ct.*	*Hours.*	*Inches.*	*°F.*	*P. ct.*	*Hours.*	*Inches.*	*°F.*	*P. ct.*	*Hours.*	*Inches.*	*°F.*	*P. ct.*	*Hours.*	*Inches.*	*°F.*	*P. ct.*	*Hours.*	*Inches.*
January	59.7	72	160.5	0.520	55.6	79	126.2	1.520	59.6	74	126.5	0 895	56.5	75	151.2	0.410	62	76	133.8	1.730
February	61.3	85	76.1	1.250	55.5	82	55 4	.460	60	74	140.5	.580	60 2	79	73.6	.835	56	85	16.3	7.945
March	61.2	82	51.7	3.900	61.9	83	88.4	3.385	63.3	77	129.5	.270	63 1	78	122	1.390	59 3	88	59.3	1.445
April	70.3	82	95.2	11.595	70.2	87	108.8	8.430	71.2	87	155.7	2.485	72 3	84	119	2.605	70.8	87	76.9	2.100
May	75.5	83	115.7	8.575	75.2	81	127.8	16.130	76.8	84	129 1	20 010	77.2	82	164.8	5.640	76	79	176	1.150
June	80.6	83	167.8	34.375	81.2	81	212.8	7.090	79.8	86	126.9	16.540	81.2	80	203.8	4.970	80.7	85	145.1	18.630
July	81.4	85	145.1	10 785	80.1	85	166.5	21.220	81.1	83	203.4	9.475	82.1	81	225.4	18.870	82.9	82	220 1	12.420
August	80.6	83	206.2	12.090	81.2	85	187.7	8.730	80.9	85	180	16.530	81 4	81	220.3	6.125	82.4	80	252.8	5.195
September	78.7	77	167 7	7.005	79.9	81	162.7	15.035	81	79	167.7	19.110	80.1	69	216 8	3.965	81.5	80	192.7	9.995
October	74.6	63	272.5	.020	75.4	70	244.6	17.870	74.5	67	198.4	17.570	74 8	75	188.1	.500	7 7.9	73	195.2	7.905
November	69.6	73	169	.340	67.9	57	294.6	.030	70	60	226	030	67.6	63	185 7	.325	71.7	76	134	2.975
December	58.8	59	175	.515	62.2	58	228.9	.045	62.4	64	151	.755	63.2	63	177.2	.200	62.2	65	167	1.290
Year	71	77	1,802.5	90.970	70.5	77	2,004.4	99.955	71.7	77	1,934.7	104.250	71.6	76	2,047.9	45.835	72	80	1,769.2	72.780

Except in valleys, the island years ago had very few trees, but it is now largely covered with young forests planted by the Government, which include a variety of handsome trees, some reaching a great size, which add much beauty to the region, among other advantages.

Pinus thunbergii, thriving on high and exposed places, Pinus densiflora, Pinus massoniana, Tristanea conferta, Cinnamomum camphora, and the bamboo compose by far the greater part of the 30,000 planted in 1896.

During a late typhoon the leaves of pines on very exposed ridges were killed, and a large number of trees died from loss of their leaves. (Report of Botanical and Afforestration Department.)

Hongkong has a costly and elaborate system of water supply—the Pokfulam and Taitam storage reservoirs, the area of the latter being 29 acres, collecting the drainage of an extensive hill surface. The quality is excellent. "From a point of view of either inorganic or organic purity, the Hongkong water supplies will compare favorably with the best water supplies of Great Britain. In the Taitam watershed, pollution with animal excreta is out of the question; and in the case of the Pokfulam gathering ground, elaborate precautions have been adopted to divert into other channels any sewage from houses situated therein."

Mean of monthly analysis of Taitam water, as supplied for use for one year—grains per imperial gallon (1 in 70,000):

Total solid matter, dried at 212° F	4
Chlorine	0.6
Hardness	1.7
Saline ammonia	0
Albuminoid ammonia	0.0018

From the calcareous sand used in filtration 1 grain per gallon is taken into solution. (Reports of Government analyst.)

The supply is insufficient at times, the rainfall varying greatly from year to year.

Total quantity of filtered water supplied from the reservoirs in 1896, 948,685,000 gallons.

Quantity supplied to each person, per diem, for all purposes: For 103 days of the year, about 10 gallons; for 263 days of the year, 16.1 gallons; to Peak district for the year, 20.5 gallons.

From the Taitam reservoir water is brought more than a mile by a tunnel, and about 4 miles by a conduit along the hillside, 400 feet above the sea, which is carried over ravines (in one place a long distance) on handsomely constructed arches of stone, and supports a fine and much-used road, from which charming views are obtained of the city and harbor, and of the picturesque hills to the eastward.

Kowloon, on the mainland, is largely supplied with water from deep wells sunk on the peninsula, which is raised by steam pumps and distributed by an aqueduct.

Constituents of this expressed in grains per imperial gallon:

Total solid matter dried at 212° F	2.7
Chlorine in chlorides	0.65
Albuminoid ammonia	0.0014
Nitrites	0

Total quantity supplied in 1896, 48,798,000 gallons, at the rate of 5.4 gallons for each inhabitant daily for all purposes.

Projects for the supply of water to the villages on the island from reservoirs so placed as to intercept the hillside streams have been undertaken, and works for some are near completion. No part of the slopes draining into reservoirs is under cultivation.

Wells are still used in the colony to some extent in safe localities, but more often for other than dietetic purposes.

Hongkong has excellent hospitals, civil, military, and naval. The most notable as being the largest is the Government Civil Hospital. Its buildings are of brick, large, and on high ground. A new and costly structure is soon to be added.

Patients of both sexes are received and it is a most useful institution, affording advantages of care and comfort of the highest order. It is under the charge of a distinguished surgeon of the colonial medical department, who also has charge of the lunatic asylum, and it has skillful English nurses (Sisters) trained in the hospitals of London.

The naval hospital has a beautiful location on a hill close to the harbor. It consists of several two-story brick pavilions with broad verandas, is light and airy, and has 68 beds. It was a pattern of neatness.

The Tung Wa hospital is for Chinese only and has been conducted under Chinese methods of treatment, but lately it has been the subject of an inquiry by a commission appointed by the governor.

> All the members of the commission were unanimously agreed that the hospital has done good work in the past and that the committee of management elected yearly is deserving of great praise for the time and attention devoted to the charitable work of the hospital. The commissioners, however, in addition to other recommendations of a minor nature, recommended that a Chinese doctor trained in Western medicine should reside permanently in the hospital as resident surgeon, and that the daily inspection of an officer of the Government Medical Department should be maintained.

This recommendation has been carried out.

Hongkong is fairly salubrious, considering its tropical position, but the long hot season is trying to Europeans and disposes to malarial and intestinal diseases.

In the British and foreign community in 1896 there were 255 births, an annual birth rate of 20.06 per 1,000, and 253 deaths, an annual death rate of 19.91 per 1,000.

Of the deaths, 85 were from diseases of local or climatic origin, shown as follows:

	Civil population.	Army.	Navy.
Fever:			
Typhoid	5	1	1
Simple continued	4	--------	--------
Intermittent	2	--------	--------
Remittent	8	--------	--------
Malarial (so reported)	7	--------	--------
Beri-beri	4	--------	--------
Heat apoplexy	5	1	--------
Diarrhœa	4	--------	--------
Dysentery	7	1	1
Hepatitis	--------	1	--------
Abscess of liver	2	--------	--------
Plague	28	3	--------

A pernicious form of remittent fever termed the "Hongkong fever," so often fatal, recurs at times, but with far less prevalence than in the early years of the colony, when it caused great mortality. The temperature rises in some cases to 108° F., the ice water pack, or even ice all over the body, being a necessary expedient. (Atkinson.)

Official reports show that a vast and difficult work of reform has been accomplished in the sanitary condition of the Chinese districts of the city since the outbreak of the plague in 1894, the extremes of filth and other evils dangerous to health in the Chinese habitations and elsewhere having aroused the Government to the most vigorous action.

The removal at the height of the plague of a dense population from an infected quarter some 10 acres in extent, in the heart of the city, and the resumption by the Government of this area with a view of reconstructing its unhealthy dwellings, was but one of the many evidences of prompt and thorough action.

The enforcement of a strict and comprehensive code of sanitary by-laws, chiefly directed against overcrowding, uncleanliness, and lack of ventilation in Chinese tenement houses, has resulted in benefits of the greatest importance.

REPORT OF CHOLERA ON THE U. S. S. BOSTON.

By M. H. Crawford, *Surgeon, United States Navy.*

On August 20, 1896, at Shanghai, China, the following letter was addressed to the commanding officer:

> Sir: Par. 1. From reliable authority I have ascertained that Asiatic cholera has made its appearance in Shanghai, China.
>
> Par. 2. As a sanitary measure, to prevent infection of the crew, I would respectfully recommend that all liberty be stopped.
>
> Par. 3. That no uncooked fruit, vegetables, or unboiled milk be allowed aboard ship, or to be served in any of the messes.

Case I.

M. S., a coal passer, aged 30$\frac{2}{12}$, native of Killarney, Ireland, enlisted August 5, 1895, at Mare Island, Cal.; was granted liberty on the afternoon of September 3. He passed the night in the Hongque settlement of Shanghai, where cholera existed in a mild endemic form. He returned from liberty on the afternoon of September 4, and applied for treatment on the evening of September 5, complaining of a mild diarrhœa. Diarrhœa mixture was administered. He was admitted to the sick list at 9 a. m. on the 6th of September with diarrhœa and colicky pains over the epigastrium, and with slight cramps in the muscles of the thighs. There were six stools during the day, presenting a yellowish color and watery consistency. He had an attack of vomiting at 8 p. m.; temperature 98.6°; pulse 80 and strong. Complains of thirst. To abstain from food and water; to have complete rest, and to be enveloped in hot flannels. Cracked ice ad libitum. Acid. hydrochlor. dil. gtt. xii, aquæ menthaæ ℥i—every four hours. Sinapisms over epigastrium. Opium and lead. Stools to be disinfected with carbolic acid.

September 7. At 3 a. m. patient was seized with severe purging and vomiting, with an increase in severity of cramps in the muscles of thighs and legs, and marked prostration. Temperature normal; pulse 60 and weak. Skin cold and clammy. Was transferred at 1 a. m. to the civil hospital at Shanghai for observation and treatment. All of his effects were removed to the hospital. The sick bay and water-closets were thoroughly disinfected with carbolic acid and solution of bichloride of mercury.

September 8. Patient passed a restless night at the hospital; had 8 stools during the night resembling rice water. Persistent cramps in the muscles of the extremities; extreme thirst with singultus. Pulse 50 and weak. Temperature subnormal, with a cold skin and general perspiration. Skin of face, hands, and feet drawn and shrunken. Surgeon of civil hospital diagnosed his disease as Asiatic cholera, and he was removed to the cholera ward.

September 9. Patient's condition seemed to have improved since yesterday. Had some nausea and vomiting, and complains of cramps in epigastrium. Had 2 stools during the day which resembled rice water. He is very low spirited and says he is going to die.

September 10. Patient had a relapse at 10 p. m., accompanied by violent purging, vomiting, prostration, cold perspiration over the body, severe cramps of muscles of the abdomen and extremities. Administered hypodermoclysis of sodium chloride solution. Friction, hot applications to extremities, and stimulants. Patient did not react, and expired at 3 a. m. All of his effects, including clothing and hammock, which had been sent to the hospital, were burned.

I think there is no question about the origin of cholera in his case. The disease was undoubtedly contracted while ashore on liberty, September 3, at Shanghai, China.

On September 8 it was reported to the commanding officer that the ship was infected with cholera by this case, and as a sanitary precaution against a further infection of the crew it was recommended that the ship proceed as soon as possible to some noninfected locality, where all the officers and crew be landed and thoroughly bathed and have a change of clothing; the vessel to be thoroughly disinfected and all clothing and stores liable to contain cholera germs be removed and fumigated.

DISINFECTION.

The hatches were battened down and all ports closed, the forward berth decks, including sick bay, dispensary, brig, pay office, forward holds, and water-closets were thoroughly fumigated with sulphurous acid. All hammocks, bags, clothing, blankets that had been used and stored on berth deck were exposed to the fumigating process. The plan resorted to aboard the *Boston* was to burn rolled sulphur in cast-iron kettles which had been previously heated by charcoal fires. Sulphur was used in proportion of 50 ounces for every 1,000 cubic feet of space fumigated. The bilges were all pumped out and disinfected. Water-closets were disinfected 3 times daily with crude carbolic acid. Berth decks were washed down with bichloride solution of mercury, 1–500.

September 11. The *Boston* sailed this a. m. for Woosung, China, where we arrived the same day, a distance of 24 miles from Shanghai. Coaled ship and sailed for Chefoo, China, on the afternoon of September 14.

CASE II.

While at sea on the 15th of September, M. G., fireman, second class, native of Dublin, Ireland, enlisted at Mare Island, Cal., July 26, 1895, was admitted to the sick list at 2.30 p. m. complaining of cramps in the stomach and diarrhœa. Pulse 70 and weak. Temperature 99.5°. He was immediately removed from the sick bay to the starboard side of superstructure and isolated from rest of the crew. Administered lead and opium, and also hydrochloric acid mixture; sinapisms over epigastrium. To wear warmed flannels. Abstain from food and liquids. At 6 p. m. he was seized with persistent vomiting, severe purging, excruciating cramps in muscles of legs, thighs, and epigastrium. Stools were of a watery consistence. Matters vomited of a greenish color. Had cold perspiration with extreme thirst. Pulse 65 and weak. Temperature 97.5°. Ordered hypodermic injection morphinæ sulph. gr. $\frac{1}{2}$, atropinæ sulph. gr. $\frac{1}{100}$. Continued sinapisms and applied friction to the extremities and hot flannels. Cracked ice and hydrochloric acid mixture ad libitum.

September 16. Patient reacted and felt better; rice-water stools, but not so frequent. Vomited twice during the day. Pulse 65; temperature 98°. Urine normal. Complained of slight cramps in muscles of legs and thighs, with intense thirst. Continued treatment of yesterday.

September 17. Rested well. Condition improved. Vomiting and purging controlled. Was transferred to the French hospital at Chefoo, China.

September 18. I visited the patient at hospital. He had rested well. Complained of slight cramps in the stomach. Vomiting and purging ceased. Had two hypodermic injections of morphinæ sulph. gr. $\frac{1}{4}$. Milk diet with aqua calcis.

September 30. Patient has recovered and returned from the hospital for duty. He had not been on liberty since the 15th of August, showing conclusively that the origin of cholera in his case was due to exposure to cholera germs on this vessel.

CASE III.

O. B. C.—Coal passer; aged 22; native of Fitchburg, Mass.; enlisted at Mare Island, Cal., August 20, 1895. Patient was admitted to the sick list at 9.30 p. m. on the 18th of September with severe cramps in the stomach and vomiting. Matters vomited of a whitish color, and were ejected with great force, and spread over blankets and neighboring hammocks. Pulse 90 and weak; temperature 98°. Has cramps in muscles of thighs and legs. Complains of intense thirst. He has had no premonitory diarrhœa and was feeling well when he turned in at 8.30 p. m. Emesis yielded to treatment at 10.30 p. m. and patient rested fairly well. Administered morphinæ sulph. gr. $\frac{1}{4}$; atropinæ sulph. gr. $\frac{1}{100}$ (hypodermically). Sinapisms over epigastrium; hot flannels and friction to extremities; cracked ice and acid mixture. To abstain from food. Hammocks and bedding infected by vomited matters were burned.

September 19. Patient was transferred to French hospital at Chefoo. Had severe attacks of vomiting after his arrival at hospital, with slight purging and cramps in the abdomen. Excreta of a characteristic rice-water appearance.

September 20. At hospital; complained of some pain over epigastrium; vomiting ceased. Had three rice-water stools during the day. Cramps in muscles of legs and thighs ceased. Very weak. Temperature 98°; pulse 60. Treatment, morphinæ sulph., stimulants, and milk diet.

September 30. Patient made a good recovery and returned from hospital for duty.

CASE IV.

T. L.; seaman; aged 33$\frac{7}{12}$; native of Portland, Me.; enlisted October 15, 1895, at Mare Island, Cal. Patient was admitted at 1 a. m. on the 19th of September with cholera. He was seized with violent vomiting, and most excruciating cramps in muscles of legs, thighs, and abdomen, with extreme thirst. Matters vomited of a whitish color. Pulse very weak; feet and hands cold; temperature 98°; cold perspiration over body. Paroxysms of severe cramps and vomiting continued at intervals of fifteen or twenty minutes up to the time of transfer to the French hospital at 6.30 a. m. He was enveloped in hot flannels. Friction was applied to the extremities with whisky. Sinapisms over the epigastrium; cracked ice and hydrochloric-acid mixture ad libitum. Administered three hypodermic injections of morphinæ sulph. gr. $\frac{1}{4}$, and finally had to resort to inhalation of ether in order to relieve the severe paroxysms of cramps.

September 20. At hospital. Patient had severe attack of purging during the night with characteristic rice-water discharges. Vomiting not so frequent and cramps subsided. Pulse continued weak. Treatment of yesterday, with the addition of stimulants.

September 21. Patient feeling much better. Vomiting and purging ceased.

September 30. Patient made a rapid recovery and returned from hospital for duty.

CASE V.

R. H., private marine, aged 33, native of New Orleans, La. Enlisted November 9, 1895, at Mare Island, Cal. He was admitted to the sick list with cholera at 9 a. m. on the 19th of September. Patient states that he had diarrhœa for two days prior to admission to the sick list. He has vomiting and purging with cramps over epigastrium and in muscles of legs and thighs. Stools watery and present a rice-water appearance. Pulse, 60 and weak; temperature, 98°. Friction was applied to the extremities and enveloped in hot flannels. Sinapisms over epigastrium, cracked ice, hydrochloric-acid mixture. Hypodermic injection of morphinæ sulph. gr. $\frac{1}{4}$, and opium and lead pill. To abstain from food. Patient was transferred to hospital at 5 p. m.

September 20. At hospital. Rested well and has improved. Stools not so frequent, but continues to have a rice-water appearance. Vomiting ceased. Treatment the same as yesterday.

September 21. Patient feeling much better. Purging ceased. Complains yet of great exhaustion.

September 30. Patient recovered and returned from hospital to duty.

On September 18 the vessel was fumigated a second time, including all compartments forward of the junior officers' quarters. The same process was used in fumigation as on the 10th of September, and no other cases occurred.

REPORT OF AN EPIDEMIC OF CHOLERA IN SHANGHAI, CHINA.

By M. H. CRAWFORD, *Surgeon, United States Navy.*

Cholera made its first appearance in Shanghai, China, for the year 1896 on the 20th of August, 1896.

CASE I.

A sailor, who had been discharged from a sailing vessel and had resided in Hongque settlement of Shanghai for the past six months, was admitted to the General Hospital on the 20th of August, with characteristic symptoms of cholera—violent purging and vomiting, with rice-water stools. He had most excruciating pains in the muscles of the extremities and cramps of the stomach, accompanied by extreme prostration and collapse. He died twenty hours after admission. As to the origin of cholera in this case, there is no doubt but what he contracted the disease in Shanghai.

CASE II.

August 23. Mrs. R., aged 41 years, native of England. She had lived in Shanghai for the past fifteen years, and kept a sailor boarding house and barroom, located in the most insanitary portion of the Hongque settlement. There was a history of premonitory symptoms of cholera two days prior to admission to the hospital. She was in a collapsed condition on admission. The usual treatment was carried out, and in addition hypodermoclysis of sodium-chloride solution was administered. The patient never reacted, and expired twelve hours after admission to the hospital.

CASE III.

August 24. M. K., second officer on one of the China merchant steamers. He was seized at 2.30 p. m. with cramps in the stomach and bowels, purging, and vomiting. He was sent immediately to the hospital, and within the next twenty-four hours developed characteristic symptoms of cholera. Treatment was successful, and he was discharged well on the 10th of September.

No more cases of cholera were reported in Shanghai until September 7, when there were two sailors admitted from the sailing ship *Drummeltoa* (this vessel had been in Shanghai for several months, and is in a good general sanitary condition) and one sailor from a China merchant steamer. The two cases admitted from the *Drummeltoa* were of a severe type, and died the second day after admission.

September 9. Two sailors from the *Drummeltoa* admitted to the hospital with cholera.

September 12. Three sailors belonging to vessels in the harbor were admitted with cholera to the hospital this a. m., and, as the *Boston* sailed the same day, I can give no further history of the endemic.

The health reports of Shanghai show that cholera has occurred there annually in an epidemic form during the summer months for the past twenty-one years.

The following table shows the number of deaths registered from cholera in the foreign settlement of Shanghai during twenty-one years:

Years.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total.
1875						5	4	9
1876		1						1
1877			1	2	9	3	1	16
1878				3	8	3	2	16
1879				1	1			2
1880					2			2
1881					7	6		13
1882				3	8	4		15
1883	1	1	10	5	5	1		23
1884							2	2
1885				4	9	12		25
1886	1			2	11	6	3	23
1887				3	13	2		18
1888				4	1			5
1889		1						1
1890				22	10			32
1891			1	10	8	4		23
1892								
1893								
1894								
1895			1	16	2	1		20

I think the above statistics prove conclusively that cholera germs originate in Shanghai, and that the disease occurs there as an endemic during the hot and unhealthy season every year.

These statistics of cholera apply only to the foreign element in Shanghai, situated in the center of a native population of 400,000, who do not observe sanitary rules.

It is impossible to obtain any reliable information as to the number of deaths from cholera in the native city, but judging from the great number of burials that occur during the summer season and the bad sanitary surroundings, the death rate from cholera must be very large.

PHYSICAL EXAMINATIONS AND SANITATION IN THE UNITED STATES NAVY.[1]

By J. D. Gatewood, *Surgeon, United States Navy.*

It is through physical examinations that a navy obtains a vigorous personnel and through sanitation that the health thus secured is maintained. It therefore seems appropriate to consider the two subjects together. Upon their close association depends primarily the efficiency of a naval service.

In view, however, of the object of this conference, it is not the intention to attempt to do more than place these subjects before you in certain of their international relations, considering them in connection with collisions between vessels and in relation to infectious and contagious diseases, through which the property of nations at peace is endangered or destroyed and the lives of citizens of different countries are put in jeopardy or lost. Under one head may be placed physical examinations in relation to color-sense and acuteness of vision and hearing, and under the other, naval sanitation in relation to the control of those epidemic diseases which are alike the enemy of the people who dwell in cities and of those who go down to the sea in ships.

Preliminary to a statement of the methods by which the United States Navy secures and maintains a sound active personnel, it seems advisable to consider in a general way the corps that is charged with the responsibility of applying those methods, for the value of a system depends largely upon the thoroughness with which it is employed.

The members of the Medical Corps of the United States Navy are selected after a careful examination that has for its sole object the determination of the degree of merit. Permission to appear before the examining board is readily obtained and there is absolutely no question of politics involved. The examiners are required, under oath, to report on the physical, mental, moral, and professional qualifications of the candidate, so that the examinations are necessarily rigid and comprehensive. The standard is placed sufficiently high to safeguard the interests of the Government, and on account of this and other reasons, which it would be useless to discuss here, about 75 per cent of those who appear fail to pass. A successful candidate is commissioned without delay, and is immediately ordered to the Naval Laboratory and Department of Instruction at New York for such study as may be necessary to familiarize him with the special duties of a medical officer afloat and on shore. This naval medical school was established in accordance with the far-sighted policy of Surgeon-General Tyron, and in the course of instruction prescribed by him are included the subjects of sanitation and physical examinations. Practical instruction in the selection of men for enlistment is given systematically at the recruiting station near at hand, where each year several thousands of recruits are examined for the naval service. Every opportunity is afforded for the application of tests for acuteness of vision and of Holmgren's method for the detection of color-blindness. Promotion in the Medical Corps is entirely by seniority and after a comprehensive examination, in which is included a most careful inspection of the naval record in each case. It is evident that a corps so constituted is not only able to do well its allotted work, but is also independent in its professional opinions and, in the performance of duty, is removed from other considerations than those of the true interests of the naval service.

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[1] Read at the International Conference of Hygiene and Sanitary Service on Railways and Shipboard, Brussels, Belgium; September 6–8, 1897.

The Medical Corps of the Navy is thoroughly impressed with the importance of securing a personnel with good color perception and acuteness of vision. The question of color-blindness received official recognition in the service about seventeen years ago, when the following instructions were issued:

NAVY DEPARTMENT,
BUREAU OF MEDICINE AND SURGERY,
Washington, March 30, 1880.

Upon the receipt of this order and the colored worsteds to be used as tests, medical officers of ships and stations will make a careful examination of all persons in the Navy as to their color sense, the result to be reported to this Bureau according to the accompanying form. Quarterly returns will also be made of the result of the examination of those who shall be hereafter examined for the service.

The method to be employed is that of Holmgren, and for this purpose a set of test wools is supplied which contains three large skeins, "test colors," green, purple (pink), and red, and a number of small skeins, the "confusion colors."

The usual mode of examination is by Holmgren's method, which may be briefly described as follows:

The worsteds are placed in a pile in the center of a piece of white muslin, which is spread out on a flat surface in a good daylight. The green-test skein is placed aside upon the white cloth, and the person to be examined is directed to select the various shades of the same color from the pile and place them by the side of the sample. The color-blind will make mistakes in the selection of the shades; or a hesitating manner with a disposition to take the wrong shades will show a feeble chromatic sense. The purple-test skein is then used. If the test with the green skein has shown the person examined to be color-blind, and on the second or purple test he selects only the purple skeins he is incompletely color-blind; but if he places with the purple, shades of blue or violet, or both, he is completely red-blind. If, however, he selects to be placed with the purple, shades of green or gray, he is completely green-blind.

The red-test skein need not necessarily be used, but it may be employed to confirm the diagnosis already made, for the red-blind will select to match the red skein, shades of green or brown, which to the normal sense seem darker than the red, while the green-blind will select shades of green or brown, which seem lighter.

PHILIP S. WALES,
Surgeon-General, U. S. N.

Daltonism as a scientific question had for years excited special interest among naval medical men, partly on account of their continued observation of the colored flags used in signaling and of the red and green lights employed in navigation with the suggestions of probable serious error. Members of the corps were familiar with the different theories advanced and recognized more or less the practical importance to the naval service of the question as a whole. The absence, however, of reliable data showing the prevalence of deficient color sense served to prevent a full appreciation of the danger, though the need of a trustworthy test that could be applied under service conditions was discerned.

When, in the Report of the Smithsonian Institution at Washington for the year 1877, a more or less satisfactory translation of Professor Holmgren's book appeared, the subject of color-blindness became a practical question in the United States, as simple means were provided to convince the medical mind and the necessary authorities of its importance. The various medical journals, scientific societies, and magazines soon reflected the increasing interest. This was to no small extent initiated and certainly greatly stimulated by the very valuable contributions of Dr. B. Joy Jeffries, which culminated in the appearance in 1879 of his book on color-blindness.

All these factors combined to increase the interest of the Naval Medical Corps, which rapidly found expression in the circular order quoted above. With the worsteds there mentioned was furnished a colored plate, illustrating the characteristic mistakes of the color-blind. The Holmgrén method has been used in the naval service continuously, though others in addition have been occasionally employed by a few with more or less satisfaction.

The standard vision-test set, supplied to each ship and station, contains a set of Holmgren wools, a copy of the report of the committee of the Royal Society on Color Vision, and sets of Snellen letters and figures. In addition, at various stations are full sets of test lenses and other apparatus of approved pattern, including of course in every medical department the ophthalmoscope, laryngoscope, and otoscope. In the test for form vision Snellen letters are invariably first employed, the acuity of vision being expressed in the usual way by fraction. In each physical examination the medical officer proceeds sufficiently far to determine the question of fitness for the service, the duties to be performed being considered. This he has to do most carefully; for with every man accepted his own name is linked throughout the enlistment and a mistake becomes a part of his record. He certifies that any recruit accepted is free from all bodily defects and mental infirmity which would in any way disqualify him from performing the duties for which he is intended. This regulation, in connection with the circular order quoted above, bars the line corps of the Navy, including all those liable to deck duty, to any color-blind person, and leads to the most careful examination in every case in which the acuity of vision is less than 20/20.

During the years 1895 and 1896, there were 16,747 persons examined for first enlistment in the United States Navy and Marine Corps, and 511, or 3.05 per cent, were found color-blind. Among those examined were 717 negroes, of whom 2.23 per cent were color-blind. All the 511 were with few exceptions rejected. Those accepted, generally with defect waived by the Navy Department, were mess attendants, cooks, musicians, coppersmiths, and the like—persons who would never be required to recognize the color of a light. In the examination of the records it was apparent that the color-blind furnished an undue amount of defective form vision, but the comparison was not determined with accuracy. While it is not practicable to record the habits of men presenting themselves for enlistment, especially as to alcohol, it is fair to assume that the use of tobacco is general among them.

Adults enlist for general service in the Navy for three years, and in the Marine Corps, which is practically a detached portion of the

Army, for five. There is, however, a special service on the receiving ships for which an enlistment of one year is the rule. These men never serve on a seagoing vessel, and are therefore not infrequently accepted when they would have been, or after they have been, rejected for general service. In this class are also some men who on reexamination have been found more or less unfit to continue to perform their duties at sea, and who have not completed the length of service which entitles them to admission to the Naval Home. There is also in the Navy an apprentice system, boys between the ages of 14 and 17 years being enlisted to serve until they arrive at the age of 21 years. These apprentices are transferred to fill vacancies in seagoing vessels as they become proficient and their services are required. In all cases in which the term of enlistment has expired, a careful physical examination is necessary for reenlistment, but in the meantime any enlisted person who exhibits a chronic disability that renders him unfit to perform his duties is discharged from service by medical survey.

For first enlistment in the Marine Corps, the standard of vision is the same as that for the Army, where it has been 20/20 for each eye since June 7, 1887. As a matter of fact an immense majority of recruits accepted for the Navy in all branches of the service have a visual acuity of 20/20. In the selection of sailors, departures from the normal are allowed in specially desirable men, who, in the absence of ocular disease, are sometimes accepted for first enlistment with a vision as low as 15/20. Men for other branches of the service are occasionally accepted with a vision below 15/20, but these are men whose work either permits the continued use of glasses or does not require better vision. On the other hand, nearly all apprentices have a visual acuity of at least 20/20, but a few specially desirable boys have been accepted with a vision below even 17/20.

In the year 1896 there were 9,414 examinations for first enlistment in the Navy and Marine Corps and 877 rejections on account of defective form vision, or 1 in every 10 or 11 persons examined. The average vision of those rejected was about 11/20 and the variations in each eye were from blindness to 20/20.

The advisability of a fixed standard of 20/20 in a physical examination for the Navy is not as apparent as first considerations would indicate. The duties to be performed on every ship are various, and as good sight is not required by a fireman as by a lookout. Theoretically, and to a certain extent practically, the latter should have at least normal vision, but a man accustomed to the sea, and knowing its varied appearances, is often able to make up by education for a small degree of impaired vision or even to surpass a less educated man with normal vision. Sometimes the extent to which this can be done is somewhat surprising, though it is apparently true that the same education associated with perfect eyes would give the best results. Practically, however, the law of supply and demand has to be considered. An able seaman is an expert, and is the product of years of training. Such a man is self-reliant and accustomed to the moods of the ocean. The ship is his home, and he is ready for every emergency. While there are many men who have been to sea since early youth, there are not so many who have come through the life untouched by its many exposures. The Navy endeavors to secure those without disease, and in doing so rejects *more than one man in every three examined*. Indeed, personal experience in the examination of merchant crews of varied nationalties goes to show that out of every 90 men about 30 will be found physically suitable for the seaman's grade in the naval service. It is believed, however, that in examining such men in times of peace the assumed standard of visual acuity should be 20/20, exceptions to be made in very good physiques, but that in no case should the vision in either eye fall below 15/20. In apprentices and landsmen a vision of 20/20 might, in the absence of war, be made an absolute requirement, though that would not exclude young hypermetropes with good power of accommodation who, later in life, would show a marked decrease in visual acuity.

The officers of the line, engineer, and Marine Corps are all graduated from the Naval Academy at Annapolis, Md., where they enter between the ages of 15 and 20 years. All candidates for admission into the Academy are examined physically by a board composed of three medical officers of the Navy. Among the many specified causes of rejection are imperfect color sense, impaired vision, disease of the organs of vision, and impaired hearing or disease of the ear. The physical examination is necessarily rigid to comply with the statute law which requires that all candidates must, at the time of their admission, be physically sound, well formed, and of robust constitution. The conditions sufficient to cause rejection are enumerated with other information in a pamphlet of regulations, copies of which are sent to the parents or guardians of candidates. This generally leads to physical examinations, often by experts, prior to appearing before the board, and frequently deters those who would be rejected or prevents Congressional appointment.

Those influences should be considered in interpreting the statistics of examinations at the Naval Acamy where, during the last ten years, out of 1,009 candidates 18, or 1.78 per cent, were found disqualified by reason of defective color sense. A careful inspection of the record, kindly made by Surg. George E. H. Harmon, U. S. N., shows that during the same period no person with imperfect color sense has graduated at the Naval Academy. This is put beyond question by the series of physical examinations each cadet passes before he becomes a commissioned officer. He is examined six times during that period by different medical officers, and in no instance has a weak color perception been discovered among naval cadets.

At each examination the visual acuity is carefully ascertained and recorded, comparison being made with previous entries. When there are defects of refraction, the examination is carried to the point of calculation of glasses. At final graduation a vision without glasses of less than 15/20 in either eye is considered a cause for rejection, especially for the line corps.

When any officer in the service is to be examined for promotion, he appears before two boards, one composed of medical officers and the other of senior members of his own corps. Each board is absolutely independent of the other in its work and opinion. The statute law requires that no officer shall be promoted to a higher grade on the active list of the Navy until he has been examined by a board of naval surgeons and pronounced physically qualified to perform all his duties at sea. It is thus apparent that the verdict of the medical examiners can not be set aside by any influences. Unless an officer passes a medical board he can not be promoted and can not remain on the active list. The physical examination of an officer is conducted with great care and in a thoroughly conscientious manner, and the verdict in every instance is based upon the deliberate opinion of the board with regard to the physical ability to perform all duties at sea.

Physical examinations and sanitation are immediately connected in the naval service by vaccination, as the Navy regulations prescribe that recruits shall at once be vaccinated, and in case of failure the operation shall be repeated until the medical officer is convinced that the person is protected. Also whenever a ship is commissioned the crew is examined and all who seem to require it are vaccinated. Members of a crew received on board from time to time during the cruise who are not known to be protected are vaccinated as speedily as possible. Arrangements are made for the frequent supply of the best virus to the various recruiting stations, and vaccination is performed with care and a due regard for its importance.

During the years 1895 and 1896 there were 14,108 vaccinations recorded in the Navy and Marine Corps. The results are shown in all but 1,977 cases, which passed by transfer from the observation of the medical officers. Out of 12,131 vaccinations, very few of which were primary, 3,026, or about 25 per cent, were successful. This persistent attempt to immunize causes smallpox to be a rare disease in the naval service and so modifies it that death seldom occurs. Little or no fear of it as an epidemic is entertained, as only its sporadic occurrence in the Navy is now known. In the year 1895, in a force of 13,191, there was one scarcely recognized case, and in 1896 a force of 14,196 furnished only 5, though the fleets visited ports where the disease prevailed. With nearly 2,000 men constantly on the coasts of China and Japan, no case occurred among them in 1895, and but 4 in 1896. There was no death.

It is the desire of the Navy Department to have a healthy service and of each commanding officer to have a healthy crew. Considerable expenditures for this purpose are made every year in artificial ventilation, distilled water, and in many other directions. The advances in the study of the causes of disease and the general diffusion of such knowledge have given a force to intelligent effort that has produced the most wonderful changes in the history of disease at sea. It is true that new problems have arisen and some old ones remain, but more weight is now given to medical opinions, and the tendency everywhere is toward greatly improved sanitary conditions. It is not, however, the purpose to consider at this time general questions of naval hygiene, but the regulations in the Navy relating to infectious and contagious diseases.

In dealing with epidemic diseases, especially those of a grave character, commanding officers are ordered by the Dèpartment to exercise great care, not only to protect the ship, but, with such diseases on board, to avoid the possibility of infecting any port. With the latter end in view each commanding officer has printed orders to strictly comply with all the quarantine regulations of a port, to give every facility and all required information to health officers, and to hold no communication by boats with the shore until there has been sufficient time for the authorities to make a sanitary inspection of the ship. No concealment of any circumstances that may subject a ship of the Navy to quarantine is allowed, and it is required that a quarantine flag shall be hoisted on arriving in port with infectious or contagious disease on board, or when such disease occurs while lying in port, and that no communication shall be allowed that is liable to spread the disease elsewhere.

While the vessels of the Navy exercise the greatest care in such matters, the precautions extending even to restricting the liberty of men suffering from venereal diseases, it too often happens that the health of ships is seriously endangered by conditions on shore. While there is no concealment of any circumstances that may subject a ship of the Navy to quarantine and health officers have nothing to fear from that source, it is not generally considered by the authorities of a port that a like duty rests upon them. For the protection of the vessels of the Navy regulations of a general character have been issued from time to time, and everywhere in the service the greatest care is exercised, especially in certain localities, but recently the question has received additional and more specific consideration, as is shown by the following order:

NAVY DEPARTMENT, *Washington, D. C., April 8, 1897.*

The following sanitary instructions, prepared by the Bureau of Medicine and Surgery, will be carefully observed.

JOHN D. LONG, *Secretary.*

GENERAL INSTRUCTIONS.

1. Strict attention shall be paid to ventilation, every care being taken to utilize to the best advantage the means provided for the supply and renewal of air.

2. Only pure water shall be allowed for drinking or culinary purposes, and harbor water, if stagnant or filthy, shall not be used for any purpose. In ports where cholera or yellow fever is occurring, whether casually or endemically, the use of harbor water upon or below the spar deck shall never be permitted for any purpose. In localities where such diseases commonly appear, the use of harbor water for washing the spar deck shall be permitted only when the tide has been flowing for at least an hour, and only on the flood tide.

3. Careful attention shall be given to the supply of food brought on board, and in localities where it is known that night soil is commonly used for fertilizing purposes none of the vegetables ordinarily eaten uncooked shall be permitted on board.

4. Clothing adapted to the climate shall be worn, with prompt changes to meet varying conditions of weather. The wearing of white duck shall be confined to days when the temperature is not below 80° F. Seventy-five degrees Fahrenheit at 7 a. m. is suggested as the standard for prescribing clothing of white duck as the uniform of the day. Bathing over the ship's side shall not be allowed when the water is below 70° F.

5. Infected ports shall be avoided when practicable. An anchorage in malarial and infected ports shall, whenever practicable, be selected to windward of and at a distance of at least 1 mile from probable sources of infection.

UNHEALTHY PORTS.

6. Upon arrival in port information regarding the health of the neighborhood shall be immediately sought, and in case of the prevalence of infectious disease such precautionary measures adopted as are consistent with the necessities of the ship and the exigencies of the service.

7. Precautionary measures in case of unhealthy neighborhoods consist in—

(*a*) Restriction of liberty on shore, either to certain hours or to the transaction of important personal business; when necessary, total deprivation of leave.

(*b*) Restriction of communication with the shore or other ships, either to market boat, mail boat, or chartered boat; when necessary, complete nonintercourse.

(*c*) Restriction of supplies (food, water, coal, and other stores) from the shore.

(*d*) Modification of standing orders or routine regarding drill, dress, diet, etc., for the crew, and the ventilation and purification of the ship or any of its parts.

(*e*) Control of any other conditions likely to affect the general health of the ship.

YELLOW FEVER.

8. When compelled to remain in any port in which yellow fever prevails, the following precautions shall be observed:

(*a*) A rigid quarantine shall be established, and if the exigencies of the service require communication with the shore, the ship's boats shall not be employed unless absolutely necessary, when the steam launch shall be selected, but no person shall be allowed to land before 8 a. m. or permitted to remain on shore unnecessarily or after sunset.

(*b*) The arrangement for the transfer of mails shall involve the least personal exposure.

(*c*) The men shall be cautioned to avoid the use of harbor water.

(*d*) All clothing shall be frequently exposed on deck, and bedding shall be aired daily for from three to six hours whenever the weather permits.

(*e*) Necessary supplies shall, when practicable, be deprived of wrappers before being allowed on board, or at least before being carried below or stored. When from the nature of the contents this can not be done, then the barrels or boxes shall be whitewashed before going below, and no straw, paper, textile wrappings, or similar packing shall be allowed between decks.

(*f*) After sunset the crew shall be required to dress in blue, and remain under cover, and shall be protected from inclement weather. When unavoidably exposed to rain, prompt shifting to dry clothes shall be enforced.

(*g*) Drills, except setting-up exercises for a short time morning and afternoon, shall be discontinued, and no labor that can be avoided shall be performed during the heat of the day.

(*h*) The heads, urinals, and water-closets shall be kept clean and properly disinfected, and they shall be fully flushed every hour from 6 a. m. to 9 p. m., water from the boilers being employed when practicable. Spit-kids shall be kept clean and disinfected twice daily.

(*i*) Blowers may be run, in ports so infected with yellow fever, at full speed from 7 p. m. to 7 a. m. Strict attention shall be paid to cleanliness, dryness, ventilation, and all matters of general hygiene, and the men required to remain on the upper deck in the daytime as much as practicable.

(*j*) In getting under weigh, mud on anchor and chain shall be carefully removed by the free use of water applied under pressure by means of a hose, and chain lockers purified by steam, after closing all openings.

(*k*) If coaling is necessary, the supply shall be obtained, if possible, from a vessel arriving from a healthy port.

(*l*) The ship shall occasionally leave the harbor for change of air.

9. The means employed to prevent the introduction of cholera on shipboard shall in the main be similar to those enforced in the case of yellow fever.

10. Every person in the naval service shall be afforded such protection from smallpox as is secured by vaccination, and in the event of the disease occurring on board each person not successfully vaccinated during his enlistment shall be revaccinated as soon as possible.

INFECTIONS ON BOARD SHIP.

11. Whenever cholera, yellow fever, smallpox, or other virulent infectious disease appears on board ship the following measures shall be carried out:

(*a*) The prompt removal of the patient or patients to a hospital whenever such removal is possible.

(*b*) The isolation on board of those affected, suspected, or who have been specially exposed.

(*c*) The prompt disinfection of localities, bedding, clothing, etc., as may be necessary or desirable, and the investigation and removal of any local cause.

(*d*) The detail from the crew of men believed to be insusceptible to the disease as attendants upon those affected.

(*e*) Strict attention on the part of officers and men to all the rules of general and personal hygiene and enforcement of such special precautions as may tend to prevent the spread of the disease.

(*f*) When the disease is cholera or yellow fever, the ship shall leave the unhealthy port as soon as practicable and measures taken for complete disinfection.

DISINFECTION.

12. (*a*) Burn mattresses and other articles which have been specially exposed to infection and are from their nature difficult to sterilize.

(*b*) Immerse clothing and bedding of patients in solution of bichloride of mercury 1 to 1,000, or carbolic acid 1 to 40.

(*c*) Treat excreta by the liberal addition of 5 per cent aqueous solution of carbolic acid or of 4 per cent aqueous solution of chlorinated lime.

(*d*) Envelop, without previous washing, the dead from epidemic disease in a sheet saturated with acid aqueous solution of bichloride of mercury, 1 to 500.

(*e*) Disinfect living spaces, holds, and other compartments by one or more of the following methods: (1) Spraying or washing all surfaces with solution (bichloride of mercury 1 part, hydrochloric acid 2 parts, water 1,000 parts); (2) exposure to sulphur dioxide, set free by combustion of 5 pounds of sulphur for each 1,000 cubic feet of air space in the closed compartment, for not less than twenty-four hours in metal ships, and from forty-eight to seventy-two hours in wooden ships, if practicable; (3) exposure to steam at a temperature of 100° C. for twenty minutes after such temperature is reached. When both (1) and (2) are employed, the latter should follow the former in metal ships that requisite moisture may be provided.

(*f*) Treat wearing apparel, carpets, hangings, and draperies by one of the following methods: (1) Exposure to steam, 100° C., for twenty minutes; (2) saturation in a solution of bichloride of mercury 1 to 1,000. Articles to which these methods are inapplicable should be (3) exposed to sulphur fumigation in a closed compartment, or when, as in the case of uniforms, this process would cause injury, (4) exposed to the action of formaldehyde from a 40 per cent solution applied on cloths between each layer of clothing and covered closely for twelve hours in a closed compartment. Such articles shall then be aired, exposed to sunlight, and brushed before storing.

UNHEALTHY LOCALITIES.

13. Parties sent on shore in unhealthy localities shall observe the following precautions in addition to such special regulations as circumstances may require:

(*a*) Avoid unwholesome food, impure water, excessive fatigue, overcrowding and exposure to humidity, and abrupt changes of temperature.

(*b*) Meals shall be served warm and at regular hours. The guard at night shall have coffee and biscuit before going on duty, and this shall apply also to all relief parties.

(*c*) A medical officer shall decide upon the advisability of any article of diet not embraced in the navy ration. Food shall be inspected before and after cooking, and the men shall breakfast previous to any exposure, and as soon as practicable after turning out.

(*d*) Suitable clothing shall be provided to meet probable vicissitudes of weather. The men shall be sheltered from rain, the direct rays of the sun, and night dews.

(*e*) A dry soil with natural drainage shall be selected for encampment, distant from and to windward of marshy ground. In towns unoccupied lots that may have been used as places of deposit for refuse shall be avoided, and sleeping on the bare earth shall not be permitted.

(*f*) All camp refuse shall be burned or buried in pits. Proper latrines shall be established, and inspected daily, and several inches of earth thrown into them twice a day.

(*g*) The details of police and inspection shall be minute.

The history of this order forms a memorable part of the sanitary history of the Navy as it is the outcome in no small degree of the noteworthy experience of the squadron in the infected harbor of Rio de Janeiro during the troubles in Brazil in 1894. No more striking or valuable lesson in sanitation and no more convincing proof of the reliability of sanitary rules could be afforded than were exhibited in Rio where an effective naval force was maintained for months in the face of the most malignant enemy now known to those who dwell in ships. During periods varying from two to five months, the United States squadron with a complement of 1,762 officers and men remained in that stricken port when the war vessels of all other nations represented had yellow fever on board and many merchant ships were deprived by that disease of their entire crews. The general health of the American squadron was uncommonly good during that period. On only one vessel did the disease appear and then through the avoidable conduct of a yeoman. Here, however, the sanitary lesson gathers additional force, for with the disease on board it was limited to four cases, the termination emphasizing the efficiency of the means employed for its destruction.

The death rate in the Navy for 1895 was 6.82 per 1,000 of strength and for 1896, 5.49. During the same periods there were no cases of yellow fever and but few cases of any other of the epidemic diseases. There is not, however, a medical officer in the Navy who does not see in that history the results of constant vigilance and who does not recognize that on the close association of physical examinations and sanitation depends primarily the efficiency of the naval service.

REPORT ON “SIROCHE.”

By F. A. Hesler, *Passed Assistant Surgeon, United States Navy.*

While at Callao a party of 10 officers took the journey on the Oroya road over the Andes Mountains, crossing the summit at 16,000 feet and remaining over night at Oroya, on Amazon tributary waters, at 12,178 feet.

All the party suffered in varying degree from the effects of the great altitude, such effects being known by the Indians of the Peruvian Cordilleras as “siroche.” At 10,000 feet, pulse and respiration rose, the party no longer sang, but literally “saved its breath.” As we climbed higher some noticed tingling of the skin and giddiness on slight exertion. At nearly 16,000 feet, in the thin, cold air of the summit, cyanosis of lips, with considerable dyspnœa, approaching prostration, showed in two members of the party. Our legs ached and severe frontal (or coronal) headache increased. As I left the car and climbed into the engine, amid a driving snowstorm, to try to photograph a nearby glacier (the ice being blasted by dynamite and carried by rail to Lima) the weight of my camera felt increased to 20 pounds. We heaved long and unsatisfactory sighs and talked little. Upon slight exertion the pulse of several rose to 130. At the Pass of Galera, 15,665 feet above the level of the sea, the road passes in darkness through a tunnel for 1¾ miles. This tried the men and I served out stimulants guardedly. Alcohol, except in cases of collapse, with cold extremities, seems to be contraindicated. Inhalations of ammonium carbonate and the administration of strychnine (gr. $\frac{1}{50}$) proved of benefit in relieving the distressing dyspnœa.

At Oroya we dined on llama, cooked over a fire of his own dried chips. The weather was cold and wet, and the party warmed its aching legs at a fire contributed to by the same useful animal, there being no other fuel used in the hotel. We slept little, and I not at all, being called twice during the night to minister unto those now suffering from diarrhœa and vomiting. Returning the next afternoon, after repairs to track following two landslides during the night, we recrossed the divide and were again silent on account of the inability to obtain the requisite oxygen.

Among these dizzy and frozen altitudes exertion and hilarity were alike suppressed. No creature whose economy requires lungs, willingly lives here except the llama, and he refuses to rise under a load exceeding 100 pounds.

Descending to 12,000 feet, the distressing symptoms began to abate, and at 10,000 feet we “again breathed free.” On the toilsome journey all the party, young and old alike, were affected by “siroche.” During a 60-mile ride down in the cab, the engineer told me of occasional, and one recent, death on his train from the disease, and that cans of oxygen are sometimes carried to avert it.

REPORT ON CHOLERA IN JAPAN AND PLAGUE IN CHINA.

By W. F. ARNOLD, *Passed Assistant Surgeon, United States Navy.*

CHOLERA IN JAPAN.

HISTORY.

It is not possible to prove definitely that the disease ever came to Japan in the three centuries preceding the present, in which it is known to have prevailed in India. Various assumptions that weigh more or less heavily against such a view will be stated below, notwithstanding their undeterminating character.

The Kojiki and the Nihonshoki refer to a great pestilence in the first part of the reign of the Emperor Sujiu, a time that is fixed at about the beginning of the Christian era. These records are said to date from 711 A. D. to 720 A. D. The former was written under imperial patronage, and the latter is said to be a collection of oral traditions. All records antecedent to them were destroyed by fire, so that the nature of this visitation is not suggested by any description or account of symptoms.

Another severely fatal epidemic about 555 A. D. was attributed to the newly sanctioned worship according to the Buddhist ritual, which is accounted to owe something of the facility of its establishment in the country to coincidences arising in the course of the pestilence. Another, that attacked Hideyoshi's army in Korea about the end of the sixteenth century, is completely indeterminate in character.

These accounts, and some that pertain to other epidemics, are supplemented by records of temples and of cities, but they are all most inexact from the nature of the system of medicine that was followed up to the time of the present Emperor. How much such a circumstance increases the difficulties of identification from descriptions may be appreciated by recalling existing inability to classify such a well-described epidemic as the plague at Athens that affected a people with whose predominant medical ideas there is great familiarity.

It is mainly for this reason that it appears impossible to ascertain the true nature of an epidemic that is said to have carried off as many as 190,000 people in the city of Tokyo alone as recently as 1773.

Cholera is claimed to have prevailed in Japan in 1790 (the thirteenth year of Genroku); but a committee appointed by the central board of health, department for home affairs of the Imperial Japanese Government, in September, 1890, to emphasize the importance of inspecting incoming vessels and of regulating the sanitary matters of the open ports, decided that the record was not convincing.

This committee affirmed that the first positive knowledge of the prevalence of Asiatic cholera in Japan was in 1822 (the fifth year of Bunsei). This epidemic is embraced in the first pandemic of cholera (1817–1822) of Hirsch, who states (Handbook of Geographical and Historical Pathology, New Sydenham Society's translation, Vol. I, p. 296) that it was introduced into Japan from Java.

The Japanese accounts mention the arrival at Nagasaki, then the only Japanese port admitting foreign vessels, of a Dutch ship in 1822. By them it is said to have come from Java; but Vincent, a French naval officer (quoted in Geographical Pathology, Davidson, London, 1892, p. 521), states that it came to Nagasaki from China. Doubtless there was intercommunication between Japan and China at this time, but it is probable that it was mainly, if not solely, by means of the Dutch ships.

Cholera raged in China for some time after 1820. M. l'Abbé Huc (Travels in Tartary, Thibet, and China, Vol. II, p. 24) describes its appearance in the year named in the province of Chantung (Shantung), China, attended by the phenomena expected under the idea of a Heaven-sent scourge.

The Japanese disclaim either record or recollection of epidemics of cholera that are affirmed by Hirsch (loc. cit.) to have occurred in 1831 and in 1854. They urge that the impressions left by the epidemic of 1822 upon the popular mind were unfortunately but too vivid to have permitted two epidemics following it in so short a time to have escaped notice entirely. I may add that I secured from several individuals confirmation of the fact that the traditions about the first known epidemic of cholera in Japan were awe-inspiring, which confirms, if only in slight degree, the assumption of its strangeness previously to the country.

Davidson (Geographical Pathology, p. 521) states that it was introduced into Japan from China in 1831; and he mentions an epidemic in the year 1842 that was confined to a few points in the northern part of the Empire. Hirsch is presumably the authority for the former statement, but the latter is not alluded to either by him or by the committee of the central board of health. If cholera prevailed in 1842, it seems likely that it was derived from cholera virus that was widely spread by the English expedition against China in 1840. Many of the troops that served in this war were collected by the government of India in Calcutta and in Madras (Macnamara's History of Asiatic Cholera, London, 1876, p. 141 et seq.). This author has traced the extension of cholera almost throughout Asia, whither it went from the impetus that it received from these military movements. He does not mention it having reached Japan, and his work contains little or no reference to this Empire.

The second epidemic outbreak, according to Japanese accounts, was from 1858 to 1860 (from the fifth year of Ansei to the first year of Manen). It was not from 1857 to 1859, as Hirsch states that it was.

It appeared at Nagasaki in June, 1858. Exact statistics of its ravages were not kept, but traditions say that it caused several hundred thousand deaths. Davidson (loc. cit., p. 521) gives 100,000 deaths as occurring in Tokyo in one month. This is probably an exaggeration, for several calamities that have long been held to have involved this full round number of human lives have been shown but recently to have been gravely overstated. He says also that its introduction into Japan in this year was by the U. S. S. frigate *Mississippi*, and the committee referred to above appear to credit an allegation to the same effect by a Dutch physician, Dr. Th. Pompe, citing a reference (Five Years in Japan, p. 280) where it appears.

That the facts in the case are quite otherwise, the records of the Navy Department of the United States prove clearly, not alone with regard to the *Mississippi*, but to all of the war vessels of the United States at that time on the East Indies and Asiatic Station. One of these ships, the *Powhatan*, received infection with cholera while lying in the harbor of Nagasaki in the autumn of 1858. The seaman who was fatally affected had not been on shore in the port, and the ship had been at anchor there for eighteen days before he became ill. The certificate of his death states that "Asiatic cholera was epidemic at Nagasaki prior to the arrival of the *Powhatan* at that port." This was the only death that occurred on a ship of war of the United States in Japanese waters in the year 1858. The *Mississippi* was at Nagasaki from June 25 to July 19 and from October 8 to October 23, 1858. There were no cases of cholera aboard her at either of these visits to Nagasaki, and no deaths from any cause. The first case of cholera that this ship's company presented was at Woosung, China, nearly a year after her last visit to Japan in 1858.

It was about the time of this epidemic that the Japanese adopted the name korrera, to replace the general term aku-bio, whose significance is about that of epidemic, and the common name ton koro, which is almost literally translated by "tumble over." Many of the older Japanese remember the time when this expressive common name was in use. Korrera is unquestionably an adaptation of the name that is now universal for this scourge of mankind. The word seems to have been popularized by the translation into Japanese by Ogata (Koan) of a treatise upon cholera by a Dutch physician named Fussland (?). According to all accounts, this translation was published at Osaka in 1857. Extracts from it indicate that it was an account of professional experiences with kondepeste (cholera orientalis; East Indian, brakrop; Japanese, korrori). I could not get a copy of it.

It would seem only reasonable to infer that its name would not have undergone change at this time if it had been hitherto as frequent a visitor to Japan as Hirsch (loc. cit., pp. 393, 403, and 411) would have it appear. Furthermore, as many of the other specific infectious diseases of the country retain names that were bestowed centuries ago, and that originated either in descriptive terms or as expressions of prevailing beliefs, one would not readily assume that cholera was one of the ills of old Japan.

Davidson (loc. cit., p. 521) admits that it is doubtful if the epidemic of 1864–65 involved the Japanese Empire, as Hirsch declares it to have done. It is not mentioned in any native records.

With the third epidemic of the Japanese accounts the accessible history of the disease begins. It broke out nearly simultaneously at Nagasaki and at Yokohama early in the autumn of 1877 (the tenth year of Meiji—that is, of the reign of the present Emperor). Its introduction into the first-named city is ascribed by the Japanese to an English man-of-war that came there from Amoy with one of her crew dead upon arrival in port. The body was buried in the Ourayama burying ground in Nagasaki, and the records of the city state that the cause of death was given as cholera. At Yokohama the first cases occurred in an American firm's tea-firing establishment. This firm is said to have imported some merchandise from Amoy, where cholera is said to have raged.

It will be noted that a period of about seventeen years intervened between the decline of the second epidemic and the appearance of the third. The latter is remarkable in presenting quite a considerable number of its cases among the soldiers and sailors that were employed in suppressing a notable insurrection in the island of Kyushu, which required the transportation of many troops through infected districts.

Only 106 cases were reported for the first half of the year 1878, but there were almost 800 cases for the remainder. The majority of the total number of cases for the year were observed in Nagasaki and in Kumamoto kens, which are separated by a comparatively narrow bay. The reason for this localization may have been the reintroduction of the disease into Nagasaki in September, 1878, by a merchant ship from Shanghai. Some patients were treated in the city hospital at Nagasaki who came from such a ship, and immediately afterwards many cases of vomiting and purging appeared among the townspeople. These cases fell off suddenly in November, but in Kumamoto there were virulent ones in December.

The committee of the central board of health admits most fairly that the appearance of cholera in Ehime ken in the early spring of the year of 1879 demonstrates the fact that it remained in Japan throughout the preceding winter with potentialities for epidemic prevalence on a very large scale. It notes further that similar localizations have been observed in Japan since that time. This matter will be considered somewhat more fully with regard to whether the disease is endemic in Japan at the present time.

No specific instances are cited to account for the introduction of the disease afresh in the fourth epidemic, 1881 and 1882 (the fourteenth and fifteenth years of Meiji). This epidemic began early in February at Yokohama, but it was most severe in Osaka, a low-lying city with numerous intersecting waterways. Nagasaki and Kumamoto kens suffered severely also.

The fifth epidemic, 1885 and 1886 (the eighteenth and nineteenth years of Meiji), was derived in a more or less intimate causal manner from the Tonkin war between France and China. The island of Hokoto, near Nagasaki, was used by the French fleet as a kind of rendezvous, and burials were frequent in the cemeteries of Nagasaki from the French men-of-war, some of which have been mentioned by name, and from other foreign ships lying in the harbor. Cholera soon appeared among the Japanese in this city that is so susceptible to it.

The virus of this epidemic was carried by French transports from the theater of this war to Toulon, and it is probable that Marseilles and other cities in France suffered from importations of this kind.

Its course in Japan the next year was quite similar to what was observed in 1879. It furnished nearly the same great number of cases and gave a longer death list.

Direct importation was proved for one focus of the sixth epidemic, 1890 and 1891 (the twenty-third and twenty-four years of Meiji). This was at Kuchinotsu, an important coal-exporting place near Nagasaki. A Japanese steamer from China took coal aboard, she being the only vessel from abroad to put in there for several days; and before her departure cases resembling cholera appeared on shore that were confined to persons who had been aboard the steamer. It is also said that the first deaths that resulted from choleralike affections in Nagasaki that year were among coolies who had worked aboard two German merchant ships from Shanghai. Proof of infection in such cases is always difficult, and it seems unusually so in Nagasaki, which harbor is small and always crowded. It would appear certain that cases resembling cholera appeared at Nagasaki and at Kuchinotsu almost simultaneously, and those who should know do not credit the idea of their common origin. It should be said that not a member of the crews of the three ships suspected showed any symptoms of cholera.

The prevalence of the disease was not so great this year as after some preceding importations of the virus, but the mortality reached a very high proportion for cholera. (See Table 2, p. 274, post.) Prompt isolation of affected individuals by carrying them immediately upon making out the disease in litters to remotely situated cholera hospitals affords little opportunity for administering measures that are so important early in this disease; and this plan must be responsible for at least a part of the increased number of fatal terminations. Another result is the protection of the community at large by reducing greatly the number of cases of the disease.

It should be borne in mind that a tendency to an increase in virulence has been noted by many independent observers in the lately prevalent epidemics of cholera in the Far East, which is confirmed in a measure by the mortality lately reported from Egypt.

An enormous amount of work was done in 1890 in the way of instructing the common people how to avoid infection with cholera. Lectures, popular publications, magic-lantern exhibitions, effective illustrations, and painstaking instruction in both general and personal hygiene were extended to a great many people.

Cholera prevailed in the latter half of the year 1891, and a small epidemic focus was established at Nagasaki rather later than ordinary. It seems to have begun about Shimonoseki (Akamagaseki) late in August. It spread quickly upon Kyushu, and was widely distributed coastwise by means of junks and fishing boats. Its source, if foreign, is but doubtfully indicated.

The seventh and last epidemic, 1895 (the twenty-eighth year of Meiji), is indubitably a result of the war between Japan and China. The disease appeared first among the Japanese troops in the Liao Tung Peninsula. More than 500 cases are said to have occurred between November, 1894, and April, 1895. One of the earliest cases in Japan was presented at Ujina (the port of Hiroshima) on February 19, 1895, by a coolie in the military service from Talien Wan, who had come thence by the transport *Shoko-maru*. A few cases followed in harbor policemen. Other cases were brought by transports to Moji and to Shimonoseki, and cases developed aboard those that carried the Imperial Guards from Japan to Formosa about this time.

Thus it seems unprofitable to look for a single source of infection where so many threatened, while its course in China may not be traced. It is doubtful if the original infecting material was met in transports that had been taken into that service from the Indian trade, although the suggestion was often made.

Some of these ships evidently carried cholera vibrios that affected troops and military coolies who were well at the time of embarkation; for the voyages were long enough to have insured more deaths in transitu than appear to have been observed, if infection of the individuals that developed cholera prior to their arrival on board had been the general condition.

SPECIAL ARMY QUARANTINE DEPARTMENT.

On March 1, 1895, at a special meeting of the central bureau of health, the establishment of a military quarantine service was decided upon from general considerations of the likelihood of importing cases of the six most formidable infectious diseases of the east, to wit: Cholera, typhoid fever, dysentery, typhus, smallpox, and bubonic plague. The Japanese troops in China had undergone exposure[1] in some

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[1] Relapsing fever was observed rather early among the sick who were invalided from China. It prevailed quite extensively in Japan in 1896, with a mortality given at from 10 to 20 per cent. Marache had observed its presence in China in the course of the allies' occupation of Peking.

Beriberi was frequently contracted, both in China and in Formosa. Infection degree to all of these diseases except the last, which appears not to have been spread at all in this war.

Special army quarantine regulations (see Appendix No. 2) were issued on March 30, 1895, and suspended on October 31, 1895. The dates of establishment of the several stations were: Ninoshima (near Hiroshima), June 1 to October 31; Sakurajima (near Osaka), June 1 to September 15; Hikoshima (near Shimonoseki, Akamagaseki, or Bakkan), June 5 to October 31.

The home department's station at Wadanamisaki (Wada Point, Kobe) had special equipment to enable it to deal with transports, and the station at Yokohama (Naghama) was similarly equipped. A full description of the latter station will be found in Appendix No. 1, together with some account of the work of the other civil stations.

Upon the completion of the work of the special army quarantine department on October 31, the stations at Ninoshima and Hikoshima were transferred to the control of the headquarters of the fifth army division and of the sixth army division, respectively. They were continued in operation until January, 1896, dealing chiefly with cases of typhoid fever and of smallpox.

The origin of nearly all of the first cases of cholera that presented in Japan in 1895 was traceable to transports. The subject of the first case seen at Moji is said to have admitted that he drank water aboard a transport that was coaling there on her return from Talien Wan. The outbreak that followed in the town was smothered by skillful sanitary measures on the part of the local authorities, but a coolie contracted the disease at the Hikoshima special quarantine station, and his case made a focus that enlarged beyond control. Two coolies who removed a cholera cadaver from the transport *Shoko-maru* on her return from Talien Wan, April 14, en route to the home department quarantine station at Wadanamisaki, were attacked with the disease almost simultaneously after about forty-eight hours.

There are many instructive instances of the limitation of the disease within quite narrow boundaries after its introduction under circumstances that would appear favorable in every way to its extensive spread. For instance, a 1,400-ton iron cargo steamer carried 1,100 military coolies to Talien Wan about the middle of March, 1895, encountering the worst weather that she experienced in the course of her service as a transport and having the largest load that she received in this work. She reached port in about four days, with 3 coolies dead of cholera and 2 in extremis. All of these cases occurred in the same compartment, but none of its very numerous other occupants were infected. The dead men were put into empty oil barrels, to be taken ashore at Talien Wan for cremation; and sufficient precautions were available with regard to the patients. It will be observed that this was an outward-bound vessel that had had no communication after leaving a Japanese port, except with a small island off Corea by means of the crew, no member of which was affected. Other similar cases were met about this time in this service.

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in the former country seemed to be much more severe, tending to the "wet" form of the disease, that is by far the most fatal.

A mild form of continued fever, attended with jaundice, was very common in Formosa. It was tedious in its course, but rarely fatal. It is not known to have spread in Japan.

The measures of the quarantine system were not applied to these maladies, for obvious reasons. Beriberi is ubiquitous in Japan—next to tuberculosis, is the most frequent cause of death among the lower classes.

The worst example of recurring infections on board a transport appears to have been due to lack of information about the ballast of an iron cargo steamer brought out of the Indian trade for use as a transport. On May 27, 1895, she brought 1,066 officers, soldiers, and military coolies from Talien Wan to Shimonoseki after a voyage of four days' duration. There was a case of cholera on board when she arrived, and others followed at about the rate of one for every hour. All hands were removed to the station ashore, the vessel was disinfected, and her crew and human freight reembarked, after which 54 more cases occurred. She went on, however, to the special army quarantine department's station at Ninoshima, having had in all 87 cases thus far. She was disinfected again on her arrival at Ninoshima, but cases appeared after a second and after a third voyage from Talien Wan, in spite of rigid disinfection. At the third disinfection that she underwent at Ninoshima her ballast, which was composed of sand, was removed, and no further infections took place aboard the vessel. One investigator at Ninoshima thought that he could demonstrate cholera spirilli in this sand, but his results were not confirmed. There were, however, live crabs in it; and it is inferred that lower forms of life might have existed where animal life was not extinguished. It was early noted that the first cases aboard this ship developed in the lowermost holds—"three stories down, always very dark," an observant layman said to me. Thence the infection was spread to the other decks and compartments, in all probability, by the ladders, manropes, door handles, and the like. The drinking water was not at fault, and her crew and the great majority of the officers and soldiers that she carried remained unaffected; at least this was true of her earliest cases. The crew of the ship were entirely exempt, so I understood.

Another transport required two successive disinfections to stop the progress of infection on board. The two ships had about 500 cases.

These incidents should serve to show, I think, that human beings in enforced contact with virulent cholera spirilli afford all of the essential conditions for the prevalence of Asiatic cholera. The unusually strong predisposing causes here in operation were overcrowding, gastrointestinal disturbance from seasickness, thirst from heat, and poor ventilation, and, in addition, the opportunities offered for direct infection from the absence of the usual facilities for serving food.

The disinfections of ships referred to were done according to the methods detailed in Appendix No. 2, which depend, speaking broadly, upon the use of steam in the Lyons apparatus for appropriate articles, carbolic acid solutions, and milk of lime. Sulphur fumigations were abandoned completely in 1890 after some demonstrations of their ineffectiveness against the cholera vibrio presented that year.

There was the greatest possible fidelity to instructions and attention to details on the part of those immediately concerned in the prosecution of the work of this department. In my opinion the unquestionably large measure of success that was attained is to be ascribed to the readiness of appropriate means and to habits of control that eliminated panic at the outset.

The organization of this department was as follows: The director (head chief) was Major-General Kodama, vice-minister of war, etc., imperial Japanese army; the vice-director (manager), Dr. Shimpei Goto, director of the sanitary board of the department for home affairs, etc. The under officials were army surgeons and army officers of the line and civil employees. Each of the three special stations was under the command of a medical officer of the army of the rank of colonel or lieutenant-colonel. At Ninoshima there were 31 officers, 28 secretaries, 725 soldiers, and 400 orderlies (i. e., noncommissioned officers and private soldiers instructed in disinfecting work). Hikoshima had 24 officers, 24 secretaries, and 280 orderlies. Sakurajima was about the same in organization as Hikoshima. The capacities of these stations were designed for disinfecting the following numbers of troops in 24 hours: Ninoshima, 6,000; Hikoshima and Sakurajima, each 3,000. Four thousand two hundred went through the process in that time at Ninoshima and 3,300 at Hikoshima.

All of the details which I obtained that relate to the work of this department are submitted as Appendix No. 2, which embraces, with the original regulations, books, forms, photographs, and descriptions, 36 inclosures.*

The reports of the special army quarantine department had not been issued at the time that I left Japan. The summaries that are given were furnished by the War Department.

TABLE 1.—*Work at special army quarantine department stations.*

	Ninoshima.	Hikoshima.	Sakurajima.	Total.
Number of ships	441	204	42	687
Number of persons	137,614	76,656	18,076	232,346
Number of officers	1,791	766	225	2,782
Number of soldiers	53,045	30,630	9,682	93,357
Number of coolies, etc	41,332	27,008	4,764	73,104
Number of sailors	41,446	18,252	3,405	63,102
Number detained five days	28,990	12,826	4,883	46,699
Number that developed cholera at stations	474	256	91	821
Number that developed cholera after passing through disinfection at stations	--------------	--------------	--------------	37

CHOLERA IN THE JAPANESE MILITARY SERVICES.

The army.—In 1877, during and after the so-called Satsuma rebellion, the cases that occurred in both the army and the navy are given as 2,136, and just one-half of them proved fatal. In 1879 there were but 417 cases with a death rate below 30 per cent in the army, although this year afforded the greatest number of cholera cases that has ever been known in a like period in the country (see Table 2, p. 274, post). Full reports of its prevalence in 1894–95 were not accessible up to July, 1896, about which time I left Tokyo.

The foregoing furnishes evidence, if such be required, that campaigns in the East are rarely unattended with serious epidemics. This fact is not very strongly emphasized, perhaps on account of the relative immunity that the European residents of this part of the world show to the endemic and epidemic diseases of the native populations. As Manson points out (Hygiene and Diseases of Warm Climates, London, 1893, p. 489), it is almost entirely due to different conditions of life; and if these differences were removed, as they would be assuredly in the camp, the frequently overestimated exemptions could not exist.

The navy.—It is stated rather indefinitely that there has been no serious outbreak of cholera in the Imperial Japanese navy since its establishment upon a basis similar to that of the navies of Western nations.

The number of cases that it afforded in 1877 were not kept separately from those of the army in that year. Forty-nine cases are reported in 1879, 1 in 1880, 1 in 1882, 3 in 1885, 19 in 1886, 3 in 1887, 4 in 1890, 6 in 1891, and 93 in 1895. The average mortality is 49.8 per cent.

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* Placed in the Library of Naval Museum of Hygiene.

In 1895, 58 per cent of the cases proved fatal. The average duration of the fatal cases was two days; and 19.8 days was the average period of convalescence. Of the entire number of cases, 53 per cent were met with on shipboard and 66.6 per cent were in Japanese ports, naval stations, etc. There were a few cases in comparatively isolated stations in China, but some very creditable work was done in excluding it from the ships on service in that country.

In March, 1895, although cholera prevailed on the transports that conveyed the Imperial Guards to Formosa, the convoy fleet was free of it, save a slight infection at the Pescadore Islands. The flagship and a hospital ship received the virus, whose course to them was clearly traced. But 9 cases resulted, and thorough disinfection after the removal of the patients ashore arrested it without difficulty.

Between 25 and 30 cases occurred in the ships, shore stations, and other naval establishments in Japan when the disease was at its height in the country. Several men-of-war became infected in home ports and were disinfected at stations of the sanitary bureau. Infected men-of-war of foreign countries resorted to these stations for the same purpose with great convenience and effectiveness. The importance of this step (certainly the readiest method of reducing the dangers of such a situation to a minimum) can not be too strongly stated.

The small number of cases in the navy would indicate much promptness in applying suitable measures to declared cases of the disease.

I did not encounter anyone in authority that presumed anything upon the belief that cholera was not a disease of ship life, and I considered obvious anxiety to disinfect every vessel suspected of conveying the virus of the disease to be forcible repudiation of such a theory.

I heard nothing of the use of disinfectants made by electrolyzing sea water. If the trustworthiness of such disinfectants are beyond question, they should be a great source of reliance for war vessels of the present day.

GENERAL CONSIDERATIONS REGARDING CLIMATE IN JAPAN.

The chain of islands, exclusive of Formosa and the small islands at the north, that compose the Japanese Empire extend from latitude 31° north through about 14 degrees of latitude in a general northeasterly direction, and this feature alone suggests the diversities of climate that are found. These differences are sharply accentuated at many places by the shelter afforded by mountain ranges, never of great height, but most of all by the Japanese Gulf Stream or Black Current, which affects powerfully the Pacific coast line of the country. It is chiefly this influence that makes the winter climate very mild in the islands of Kyushu and Shikoku and in the province of Kishu, on the main island. Many plants and trees grow spontaneously upon the former islands that are difficult to rear with skillful attentions upon the latter, and Shikoku is the only part of Japan in which two crops of rice may be produced in a year. In the northern part of the main island, Hondo, as well as in the Hokkaido, snow persists on the tops of the small mountains throughout the summer. The northwestern or Japan seacoast has a variable and quite a trying climate.

Dr. Rein's Japan contains the following data: The range of temperature is very considerable. Changes of temperature are sudden and may attain to 14° or 15° C. in a few hours. There is no dry season. It rains every month, but it is most abundant, as a rule, in summer, at the beginning and at the end of the hot season.

	Latitude.		Mean of winter.	Mean of spring.	Mean of summer.	Mean of autumn.	Annual mean.	Rainfall
	°	′	° C.	° C.	° C.	° C.	° C.	*mm.*
Osaka	34	20	6.2	13.7	25.3	19.0	16.0	1,054
Tokyo	35	41	3.6	12.5	24 0	14.6	13 9	1,671
Nagasaki	32	44	6.5	14.7	25.0	18.3	16.1	1,212

Other writers give the average temperature of January, the coldest month, at Tokyo as 0.5° C., and that of August, the hottest month, as about 25° C. Frosts are frequent at night in the last month of autumn, throughout the winter, and in the first month of spring. Ice thick enough to bear skaters is rare about Tokyo, but it is to be found in Yesso (the Hokkaido) and in the higher mountainous regions of the main island from October until June. In the last-mentioned places, however, the summer temperatures run almost as high as in other parts of the Empire.

Systematic observations of the atmospheric pressure, temperature, wind, rainfall, and state of the weather are made at 50 meteorological stations that are comprised in 7 weather districts numbered serially from the southward. Observations of the relative humidity of the atmosphere are not issued, and I was unable to learn of the existence of any reasonably complete information regarding the ground water in any part of the country.

PUBLIC AND PERSONAL HYGIENE OF THE JAPANESE PEOPLE.

Briefly stated, the most obvious risks to the public health are maintained almost everywhere in the way of primitive water-closets, and these risks are intensified by the conservancy of dejecta without treatment which is capable of reducing greatly many of the dangers, from cholera in particular. The cities have until very recently been supplied with water by aqueducts that lead streams from the hills into conduits under the streets. Osaka now has a system of sand filtration applied to river water, and many plans are being arranged in other places to improve the quality of this most important hygienic agent. An addition to the water supply of Nagasaki proved more or less inadequate in the summer of 1895, when it was needed the worst.

The admirable personal cleanliness of the Japanese people as a whole acts somewhat to conceal some faults of their personal hygiene that render individuals quite susceptible to cholera. The free use of unboiled water was not formerly so common as at present, I am told, and too little attention is given to avoiding danger by cleaning utensils for eating purposes with water above suspicion. Of the influence of festivals and of personal habits I shall give some details below.

TOKYO AND OSAKA IN THE CHOLERA EPIDEMICS OF 1890 AND 1895.

It is convenient to use these independently governed cities for the two reasons that they are not too large to be represented accurately by the meteorological data of their stations, and because the statistical accounts of the disease in them are more satisfactory than any others available. Kioto, having furnished only about 1,000 cases in 1890 and about 1,800 cases in 1895, will not receive detailed investigation, notwithstanding the excellent sanitary work that made the exposition in commemoration of the eight hundredth year of the city's capitalhood highly successful although thus gravely menaced.

At the time of the appearance of cholera in Tokyo in 1890 the city was estimated to have had 1,314,462 inhabitants. There were 4,027 cases of cholera reported for this year, and there were 3,307 deaths, nearly all of which occurred in the last two months of summer and in the autumn. There were two public cholera (quarantine) hospitals, in which 2,477 cases were treated. The mortality in these was 75.5 per cent. Seventeen persons are given as receiving infection in them.

The rainfall for the summer and for the autumn of this year was 590 and 577 millimeters, respectively. Practically the same amount of rain fell in the spring. There was least in September (103 millimeters), when 2,442 cases and 2,006 deaths occurred; and it was greatest in August (336 millimeters), in which month there were 783 cases, with 583 deaths. October had 299 millimeters of rain and 707 fatal cases out of 741 persons attacked. It began as an epidemic in the last week in July, when 26 millimeters of rain fell, there being 106 millimeters in the entire month. The temperature ranged between 4° and 7° C. the third week in November, and subsequently there were only two cases reported. The subsidence in this case happened to follow quickly a very heavy rainstorm—106 millimeters—on November 17.

Regarding the location of cases presumably connected in their origin, an asylum in the Honjo district had 38 cases; the Dotei female school 23; and 7 houses from 11 to 15 cases each.

In the home department's review of this epidemic there is this definite statement: "The disease was propagated by means of conduits, and the epidemic was most progressive during the rainy season, when the water was generally dirty." The conduits referred to are the passages under the streets through which city water is distributed after being led in through aqueducts. They are tapped at intervals by wells whose curbs are not always the best adapted for excluding surface drainage, while other channels of infection are but poorly guarded.

In 1895, out of a population of 1,303,876 (estimated for December 31, 1894), there were about 3,300[1] cases, giving some 2,500 deaths.

The first patients in the city were army officers returned from China who had disembarked from transports about the middle of May at Ujina. One of them appears to have contracted the disease from the other. There were some other importations of the disease into the city subsequently, and it spread steadily.

June gave about 100 cases; July, 600; August, 750; September, 850; October, 1,000; and November, 85. After the middle of November the mean daily temperature was below 10° C., and cases ceased to be met on consecutive days.

The rainfall from April to November, both inclusive, was 95, 55, 186, 285, 95, 82, 149, and 122 millimeters.[2]

In Osaka in 1890, a population estimated at 364,761 persons showed as many as 8,815 cases of cholera. There were 7,486 deaths. Five cholera (quarantine) hospitals treated 4,215 cases, with a mortality of 78.5 per cent. In them 66 attendants, etc., are reported to have been attacked.

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[1] These and some subsequent figures relating to the epidemic of 1895 were made from reports issued from time to time in the Official Gazette; and, as cases for more than one day are often grouped together, it is not practicable to give the cases for a given time exactly. The totals given may also differ slightly from the revised returns of the home department, which I did not receive.

[2] A cyclone at the beginning of the second week in September was very pronounced over Kyushu, where a result was a very considerable lowering of the temperature. Its effects were not perceptible either at Tokyo or at Osaka, but in Nagasaki ken the cases after the typhoon never reached one-third of the previous daily average.

It became epidemic in the city in August, 1890, the rainfall for the month being 28 millimeters, and 1,889 cases occurred; 5,666 cases followed in September, with 139 millimeters of rain; 1,134 cases were observed in October, which had the greatest amount of rain of any month of the year (188 millimeters). It ceased practically when the temperature fell below 10° C., late in November. There were 220 millimeters of rain in the summer, 403 in the autumn.

As it had raged for some time in the vicinage of Nagasaki before reaching Osaka, a great deal was done by the sanitary officials and by a private board of health that wielded great influence to improve the general surface cleanliness of the city. This was done so thoroughly that the failure of the expensive experiment was too obvious for misinterpretation. It fully determined the people of the city to improve the water supply; and the city assembly unanimously voted the acceptance of a memorial by the Osaka private board of health recommending the installation of a system of filtration with sand. Unfortunately this important public work was not completed until after the epidemic of 1895 had passed. Only 5 cases of cholera are returned from Osaka for the year 1896, however, and only 1 of these was fatal.

Here, as elsewhere throughout the Empire, lecture meetings were held by public-spirited citizens with the aim to instruct the common people to avoid the disease. Free tickets that afforded boiled or pure drinking water were distributed and disinfection was carefully taught and well superintended. Many physicians joined the board to further its purposes, and Shinto priests and Buddhist monks vied with each other in promoting the work of prevention. Much was done to allay prejudice against quarantine hospitals.

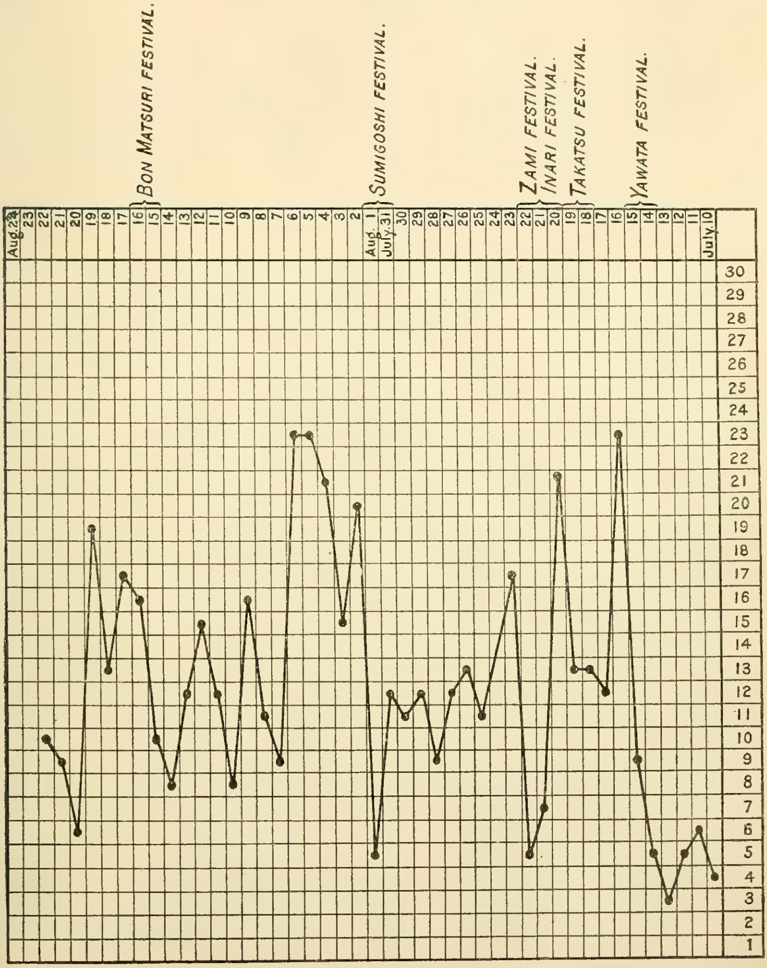
The population of Osaka at the end of 1894 was 484,409.

Some cholera cases from Hiroshima reached the city in April, 1895; 90 cases developed in May; nearly 500 in June; more than 1,700 in July; about 3,600 in August; almost 1,075 in September; not quite 225 in October, and 25 in December. The rainfall for these months was 1,043 millimeters, distributed as follows: 53 (April), 95 (May), 251 (June), 220 (July), 89 (August), 198 (September), 88 (October), and 49 (November).

It will be seen from page 268 that almost the average amount of rain for a year fell in these eight months. Yet it was observed here and at other places that I visited that cases were more frequent when the streams were muddy; "red," as a sanitary inspector said in mentioning the fact. I take this to mean that infection is spread very often by surface drainage.

The measures opposed to the epidemic of 1895 in Osaka were perhaps as thorough as could have been applied at any other place. Seven thousand four hundred cases were treated in 6 cholera (quarantine) hospitals, 4 of them being large establishments. Five hundred and nine medical officers, sanitary officials, attendants, etc., had to do with the disease in all of the city, and of these but 9 became infected. One of them was a police surgeon.

Fêtes were forbidden in the early part of July, and the experiment of closing the theaters proved that these gatherings of the people were of little influence in spreading the infection of cholera. On the other hand, perfectly patent results ensued upon restricting the sale of cooked foods, such as cold macaroni (a very popular dish with some classes in Japan), confections of various kinds, and cold drinks. In cases in which extreme measures were considered appropriate, shops dispensing such articles were closed by the police. Their regulations for several years past have required foods sold in a state permitting immediate consumption to be protected from the access of house flies. I was informed that this order had been enforced since 1890, and its raison d'être is discussed in the Annual Report of the Central Sanitary Bureau, Department for Home Affairs, 1891, published at Tokyo in 1894. This, I may add, is the first application in practice that I have met of obviating a danger that was first suggested, I believe, by Surgeon-General Moore, Bombay Presidency (Prevention of Diseases in Tropical Campaigns. Andrew Duncan, London, 1888, p. 310).



Cholera vibrios were not found in Osaka city water, so far as I could learn, nor were they demonstrated in water from several suspected wells. Nevertheless, police guards about the latter had perceptible influence upon the number of cases in the neighborhoods that used water from them.

There was in this city an attempt of the utmost directness to portray the part performed by excesses in eating and in the use of alcoholic drinks in predisposing to cholera. The subjoined diagram, reduced one-half, was issued by the authorities of the south quarter of the city government of Osaka, in the form of an inexpensive handbill, to which the following notice was attached:

Public notice.

[Issued by the authorities of the south quarter of the government of Osaka Fu.]

On account of the excessive rain since spring, we have considered that an epidemic would surely break out and rage, and we took every necessary step as far as was possible to prevent it. But cholera broke out in Japan, and Osaka was not exempt. This in spite of our earnest exercise of all preventive measures and thorough application of disinfecting processes.

There have been many people careless of their lives, and some have sacrificed themselves through their careless habits of life.

We have peculiar customs among ourselves of inviting our relatives and of being invited by them on ceremonial and on festival occasions, when all not only have a good time, but eat and drink so much that they disorder their systems. Such things very frequently invite cholera, especially the festival ceremonies that are mostly observed in summer, when edibles are quickly putrefied. How dangerous it is to devour these putrefied things like gluttons!

There is a custom among Osaka people of having a holiday on the 1st and on the 15th day of every month, and of allowing employees and servants to divert themselves at their own pleasure. This is something like letting a bird fly out of its cage.

It is nothing less than piteous to see these people eating and drinking greedily on these occasions and consequently throwing themselves into the abyss of cholera.

We affix hereto a table of the daily cases of cholera from July 10 to August 23, to remind you of the fact that the majority of cases occur in a day or two following each of these festivals. Now summer festivals are passed, and we are in autumn; but the heat is yet quite burning, and the cholera cases have not yet decreased at all.

The Lantern festival, the Ancestral Spirits' festival, and the Jizo festival are right before you, and they will require the exercise of great care and prudence on your part. These festivals are commendable as good things only under certain conditions, especially as the most perfect freedom of creeds is guaranteed by law so that they can not be controlled by anyone.

But how sad it is to see the people endangering themselves on account of such opportunities!

At the Ancestral Spirits' festival and at that of Jizo Matsuri the people fast (or at least they eat nothing but vegetables and things dried) for three days, and then they eat animal food and fish, and drink *sake* until they find themselves out of health for a time.

Anyone can easily see that stomach and bowel troubles are just the very next things [literally, next door] to cholera, more especially when the disease is raging on and on.

It is very well to adore and to venerate with worship the spirits of ancestors, but in such cases it only serves to increase this disease to follow the beautiful idea to this extent.

Should the spirit of an ancestor see any of his posterity dying of cholera on account of eating and drinking too much in order to venerate him, how he must lament!

It is worthy of remark that the greatest number of cases of cholera reported for a single day in 1895 was on August 18, two days after the Bon Matsuri festival. On the day of the festival 903 cases occurred; on the second day after it 923 cases. In Nagasaki Ken almost double the number of cases given by any other day fell on August 18. For the whole country, except in the week of this festival, beginning with August 16, 860 cases in a day were never exceeded, and 800 cases only six times.

At Hiroshima, in 1895, the yearly festival at Miyajima was noted as having greatly augmented the number of cases. This increase, however, was not an immediate one, as a number of days elapsed before the return of many of the participants to their homes, where they sometimes infected other persons.

The epidemic of 1890 does not show clearly any effects of festivals.

The city and ken of Hiroshima had many trying experiences in 1895.

The first cases here were among the military coolies, harbor policemen, boatmen, and soldiers in the first months of the spring, but they were not very numerous. Efforts to stop intercourse with some suspected individuals were productive of disturbances on the water front at Ujina in April, and this plan of isolation was abandoned. The prohibition of the use of water from stagnant pools had notable influence in reducing the number of cases, many of which could be traced to the booths on the wharves at Ujina. The police regulations about house flies were rigidly applied. These insects are said never to have been troublesome in Hiroshima before, but they were increased threefold in the neighborhood of the city by the presence of the troops and horses collected together there.

The work of the highly efficient sanitary police of this prefecture was much increased by some of the other incidents of the year. Late in July a typhoon destroyed 8 of the buildings that contained infectious cases in the army temporary hospital at Hiroshima. This great loss of hospital room for such cases necessitated the use of every available building, and laxity of control of cholera cases followed to a certain extent. Five hundred and three cases were treated in the temporary hospital here, and 305 of them were fatal.

The disease declined greatly late in September, presented relatively few cases in October, and disappeared after a comparatively slight cold wave early in November. The epidemic of 1890 followed precisely the same course, closing in the month of November after a week of mean daily temperature below 10° C.

The cholera (quarantine) hospitals in this prefecture are commodious and well, very well, kept. In one of them Kitasato's serum treatment was employed in 36 cases.

An unusual incident of the efforts to induct the common people into habits capable of affording them greater immunity from cholera was the establishment of a microscope in a temple through private enterprise. It is said that the demonstration of the living organisms in water to housewives was much more impressive than lantern exhibitions or any other means of illustration.

In Niigata ken on the Japan Sea coast more cases occurred in the autumn of 1895 than were presented relatively by any other section at that season. But the entire number found here was small, and the disease as an epidemic behaved under the influence of low temperature precisely as elsewhere. It persisted a little longer in Chiba Ken (near the head of Yeddo Bay) than at any other place; and here in January, 1896, a highly virulent outbreak occurred that was limited fortunately to 43 cases. No details of this small winter epidemic were secured. But one case (nonfatal) has been reported from that prefecture since that time.

Contrary to the expectations of many observers, the year 1896 showed fewer cases of cholera and of spurious cholera combined than have been returned for any other year since the establishment of vital statistics in the country. But 350 cases are given, and the death rate from this number, although imperfectly stated, is probably below 40 per cent. The spread of the infection in 1895 was unquestionably greatly facilitated by the return of the Japanese troops from China before the completion of the disinfecting section of the special army quarantine department, and by the intercommunication that their return excited throughout the country. This took place not only by public conveyances, but also by individuals and by means of numerous small boats, whose movements are quite beyond effective control within reasonable limits of expense.

A special station of the sanitary bureau of the home department was established at Takasaki for dealing with the cases that were expected to be met with in this gateway of communication with the northern part of the Empire. I did not visit it, nor did I secure any account of the work performed there. The general arrangements that were carried out for the detection of cases that occurred on railroad trains were well devised, and they yielded good results in practice.

Since the disease was introduced into nearly every prefecture of the country at a comparatively early season of the year, I think it is evident that its activity was limited very greatly by the vigorous efforts put forth on all sides against it. It would appear, furthermore, that the small number of cases found in 1896 are a measure of the effectiveness of modern sanitary precautions that have been applied under circumstances not altogether favorable to final estimation of their great value.

The following table, which shows the cases of cholera in the Japanese Empire for the past twenty years, has been compiled from the reports of the department for home affairs and of the sanitary inspector, United States Marine-Hospital Service, Yokohama, Japan:

Table 2.

Year.	Number of cases.	Number of deaths.	Mortality.	Months of prevalence (inclusive).
			Per cent.	
1877	13,816	8,027	58.10	September to December.
1878	902	275	30.49	January to December.
1879	162,637	105,786	65.04	March to December.
1880	1,580	618	39.11	February to December.
1881	9,389	6.237	66.43	January to December.
1882	51,631	33,784	65.43	February to December.
1883	969	434	44.79	January to December.
1884	900	415	46.11	March to December.
1885	13,772	9,310	67.60	August to December.
1886	155,923	108,409	69.52	January to December.
1887	1,228	654	53.26	January to November.
1888	811	460	56.79	April to November.
1889	751	431	57.39	March to November.
1890	46,060	35,248	76.90	June to December.
1891	11,142	7,760	69.64	Do.
1892	874	497	56.88	June to August.
1893	633	364	57.50	January to November.
1894	546	314	57.51	March to December.
1895	53,999	38,500	71.28	Do.
1896	350	150?	----------	January to December.

BACTERIOLOGY AND PATHOLOGY.

The very natural wish to avoid the penalty of a substantial fine for each failure to report a case of infectious disease to the sanitary police doubtless serves to exaggerate the cases returned as cholera. Besides, the central sanitary bureau does not encourage refinements of diagnosis that involve too often both equivocal results and delays. It must be admitted that little is lost by the safe mistakes in diagnosis in a country where panic has so little influence. Much expensive and useless general disinfection is done, to be sure, there as elsewhere, and it may be expected to continue while this inexactitude obtains. Still, every indication is for constant and rapid improvement in these matters. The definite work that the Hamburg epidemic developed will find wide application in Japan.

The first cases that occurred in Tokyo in 1895 were proved to be

Asiatic cholera at Professor Kitasato's institute for infectious diseases in Tokyo. Some work of the kind was done in earlier epidemics by some members of the staff of the Imperial University at Tokyo.

There were 172 examinations of dejecta made at the institute for infectious diseases, with 82 positive results. Two ambulatory cases were discovered through these examinations. For methods, see Appendix No. 3. A considerable number of the surgeons of the military services and of police surgeons employed by the central sanitary bureau receive instruction in bacteriology at this institute every year.

No accounts of original pathological investigations regarding this malady came to my notice. Such work is much discouraged by the great prejudice against autopsies, which are entirely forbidden by order of the military services. Cremation is almost always applied to cholera bodies, to reduce the risks of infection from them, which acts as a further hindrance toward good work on the effects of the vibrio upon the human tissues.

RESULTS OF COLLECTIVE INQUIRY ABOUT TREATMENT, SEQUELÆ, METHODS OF INFECTION, RECURRENCES, PREDISPOSITION, ETC.

In January, 1896, I sent out a collective-inquiry circular to Japanese physicians who had treated a considerable number of cases in the preceding year, 99 of whom returned answers relating to 12,008 cases not considered elsewhere, save in a general way, in this report. The mortality of these cases was about 64 per cent. In 1,553 cases in which opium constituted a considerable part of the treatment, it was reduced to 59.3 per cent, a result that is merely a deception through statistics, in my opinion. This drug is always used cautiously, and in very many hospitals its employment internally is forbidden altogether. Morphine *sub cute* is but infrequently used. Some of the most experienced physicians hold to small doses of calomel in the early stages of the disease, and rely much upon mustard baths. It must be admitted that one unfailing lesson of much experience with cholera is the futility in great part of medicinal agents internally.

Kitasato's serum treatment was returned as showing a mortality of 33.1 per cent in 164 cases at Tokyo and 34.1 per cent in 61 cases at Hiroshima. It is not at all likely that a series of cases of average severity would yield anything like such favorable results, even comparatively.

Cantani's enteroclysis was reported as applied to 987 cases; its use in many other cases was referred to too indefinitely to learn how it was regarded. It would appear to have earned some measure of confidence, as many commend it as far as their experiences guide.

Hypodermoclysis was frequently practiced. Some experimental mixtures, emulsions, and solutions were also returned as having been thus exhibited. Three large sloughs, 22 abscesses, and "several inflamed nodules" are reported as accidents following this procedure; 6 of the abscesses were caused by quinine solutions. The 10 cases of intravenous injections mentioned offer little to be recommended over hypodermoclysis, which seems to have been disappointing in its results.

Eruptions, variously characterized as urticarious, rubeolous, roseolous, and roetheln-like (and most sparingly described otherwise), are given in 1,822 cases. In about 10 per cent of these cases the eruption is said to have been limited, confined to a limb, or circumscribed. Urticaria-like effects were the most often general. The face, the chest, and the arms seem to have shown roseola the most frequently; one case of it is said to have ulcerated, and to have had a tedious convalescence. Another is described as emphysematous, but there was no further description of either.

These eruptions upon the skin seem to have impressed some observers as favorable in a prognostic way. One physician found that the nurses in a large hospital looked for them with interest on account of the hopefulness that their appearance inspired. It is possible that the short duration of the illness of fatal cases prevents them from developing in many cases.

Erysipelas as a sequel of the disease is mentioned twice.

Parotitis was given as a complication of convalescence in 92 cases, 73 of which required incision. There are no accounts of the bacteriological examination of the pus in any of these cases.

Nephritis was the most frequent sequel, if it is not really a part of the disease; but it was returned in a manner that prevents summarizing. Thus nearly every well-marked case in a large quarantine hospital in Osaka is said to have shown albuminous urine. In the Tokyo hospitals 753 cases gave 49 deaths from uræmia.

Other sequelæ mentioned are, abortion, endometritis, mastitis (presumably in the female, but not so stated), uterine hæmorrhage, diphtheritic inflammation of the female genitals, hæmorrhage from bowels, diphtheritic inflammation of bowels, gastro-enteritis, peritonitis, stomatitis, ulcerative pharyngitis, recurrent suppurative myositis, athetosis, meningitis, melancholia, "cerebral symptoms," jaundice, hepatitis, hæmaturia, cystitis, otitis externa, corneal ulcer, bronchitis, broncho-pneumonia, lobar pneumonia, beriberi, and hiccough. Of the last, 7 cases, including one that I saw in Tokyo in August, 1895, recovered without incident.

Reinfection in 33 cases was returned as occurring in the epidemic of 1895; 16 of these patients died in the course of the second attack; one man is reported to have undergone a third attack, in the course of which he died. Victims of this epidemic to the number of 22 are believed to have been attacked by cholera in previous epidemics.

There were 2,009 microscopical examinations of dejecta reported, along with 548 culture tests. The Finkler-Pryor bacillus from a case of cholera nostras at Kumamoto is entirely isolated.

Many more or less reasonable presumptions of infection from utensils, foods, and such matters are suggested. Few of them are even of fair value, however, chiefly from lack of detailed description.

Nothing stronger than unsupported conjectures was returned in response to inquiries about the agency of flies in spreading cholera.

Station in life was thought to predispose more to cholera infection than such personal habits as smoking, moderate drinking, and the like. Smoking was often returned as without influence or as an actual protection against the disease, while excessive *sake* drinking is fairly constantly given as predisposing cause.

Unequivocal expressions of the influence of a bad water supply came from Osaka and other places. Three interesting instances of infection through drinking water, extending to 64 individuals, were noted at Takaoka, Toyama Ken.

LIABILITY TO INFECTION OF PHYSICIANS, HOSPITAL ATTENDANTS, AND OTHERS.

Of these the largest number was found at Ninoshima. There were 84 infections here; 35 of them were in nurses and in members of the crews of sampans used in unloading transports; 26 were in coolies, and the rest were in soldiers carrying on the work of the station. Of this number 45 died, but 14 cases merely suspected of being cholera all recovered. At the Hikoshima station 32 cases of infection resulted, but the classes represented were not separately stated. Infections (not reported in detail) occurred among the attendants at Wadanamisaki and at Shimonoseki; also in 13 attendants at the Nagahama station. Other institutions were not fully reported on this head, but I presume that infections were vastly less frequent than in 1890 from the many attentions that I know were paid to this very real danger of the heedless.

IS CHOLERA ENDEMIC IN JAPAN?

In considering the history of the disease in this country, it has been seen that six epidemics at least have ravaged the country since the disease has been identified; that two very long intervals have elapsed in which the absence of the virus from the country is most probable; that, although cases have been reported every year for a generation past, importation appears to have been responsible for every epidemic within that period, three of which have been materially assisted by the operations of war. China is the admitted source in nearly every instance of the importations claimed; so that the argument that would acquit one country of harboring this scourge must implicate the other. It would appear, however, that the conditions of life favor the survival of the cholera vibrio the least in Japan, where the dark, hot, and crowded living rooms of the Chinese do not exist. The facts observed in Japan do not appear to me to warrant the conclusion stated by Davidson (loc. cit., p. 541) that cholera is of late years endemic there, breaking out with renewed virulence after periods of latency; nor can Vincent, whom he quotes in this connection, be sustained in the affirmation that "cholera is, without doubt, the disease which causes the greatest ravages among the Japanese." As in other countries that present even more unfavorable general conditions for the domiciliation of the cholera vibrio, Japan has retained it in a state capable of reproduction and of infecting individuals, sometimes quite virulently, for considerable periods; but it is not clear that a characteristic epidemic has ever sprung from vibrios remaining in Japan for more than a few months. In other words, the virulence necessary for epidemic effects must be secured by importing cholera vibrios, which is usually accomplished in a way apt to heighten their virulent properties to the utmost.

Since 1893 an experimental basis has been established that will sustain the explanations of many facts concerning the so-called winter epidemics of cholera. The following illustrations are derived from Dunbar's paper (Ergebenisse der allg. Ætiologie der Menschen und Thierkrank enheit., 1896, p. 804 et seq.).

Cholera spirilli may remain alive and capable of reproduction for years in as severe a climate as that of Germany through the assistance afforded by walking cases and by individuals that show no symptoms of the declared disease. The time for which convalescents may carry about cholera vibrios capable of reproduction has been proved by Rommelaire to be forty-eight days, and the period of life in dejecta is by far greater than has been accepted hitherto. Lubarsch found cholera vibrios capable of growth upon suitable media in stools from cholera cases that had been kept for twenty-eight, seventy-six, one hundred and forty-three, and one hundred and sixty-three days. Dunbar, working at room and at refrigerator temperatures with peptone solution inoculated from cholera stools, found them capable of development after eight months. The last-named observer holds that it is necessary for dejecta to infect some medium of common use, such as food or water. He does not regard the direct infection of individuals from dejecta as the rule.

Conditions essential to its survival and propagation upon foods are not of such nicety as have been admitted. Some of Kitasato's early experiments showed that acidity was its chief enemy, but Heim observed its survival for six days on a very acid medium. Such possibilities of growth only can explain some cases that are presented by ships. In general, the life of the cholera vibrio is longest in dark, moist places at room temperatures. Growth takes place at 16° C., in some instances at 8°. Foster, Kitasato, and Uffelmann have shown that it will live after four days' exposure to freezing temperature; Renk found it alive after five days at —7° C.; Abel after three days at —20° C., and Dunbar secured living cultures from a cholera stool that had been kept for twenty days at 0 C.

The adaptation of river water to its preservation, distribution, and reproduction is indicated by the experiments of the late Dr. Orgel, who found that the Elbe water kept it for about a year in a state capable of development. It would thus appear further that its growth is not unfavorably influenced by enforced association with other organisms.

The primitive arrangements serving as water-closets throughout Japan, the conservancy of human excrement, and the liability of many water supplies to contamination, are conditions as favorable to the requirements of the cholera vibrio as could have been supplied by design. Under these circumstances, with the foregoing laboratory results in mind, there would appear to be little difficulty in understanding both the customary subsidence of cholera in Japan in the late autumn and the comparatively numerous but widely scattered cases of the year or years succeeding. Other countries, in which infection is more infrequent, have shown and are now showing instances of the survival of cholera vibrios that are more noteworthy than any of the recent experiences of Japan. They are not expected to become permanent homes for the cholera vibrio, whence it may be carried to yet other countries; and I doubt if Japan has much to fear in this direction.

In the Japanese Empire, the game, as Hueppe calls it, of deciding whether a given series of observations supports Koch's views or Von Pettenkofer's excites little interest; and, as far as I could discern, opinions about autochthonism and localism influence no public measures. Dr. James Cunningham's eight views (The Cholera: What Can the State Do to Prevent It? 1884) are also without champions. On the contrary, the lesson conveyed in Dunbar's admirable résumé of the recent work upon cholera is fully understood: "The cholera organism is the link in the chain that can be assailed with results."

PLAGUE IN CHINA.

HISTORY.

Monsieur E. Rocher was among the first to observe the plague in the far East in Yunnan, the southwestern province of the Chinese Empire. He recognized it readily and gave the presumption of its importation thither through Burma a prominent place in his treatment of the question of its source. He notes (Le Province chinois du Yunnan, Paris, 1874, pp. 75 and 279 et seq.) the very irregular manner of its spread, which he illustrates with a map. He escapes the errors of nearly all of the other lay observers of plague in this locality of assigning it limits of prevalence demarcated by altitude and by slight climatic differences. (Cf. Happer, Imperial Chinese Maritime Customs Annual Reports, 1889; Les Missions Catholiques, 1886.)

Little better than speculation can be offered to account for its presence in Yunnan. Caravans employed in trade between China and southwestern Asia may have transported it hither; for they are known to have spread cholera from China down the valley of the Irrawaddy River (Researches, E. A. Parkes, London, 1847, p. 48), and to Yarkand (Macnamara, Hygiene and Diseases of Warm Climates, London, 1893, p. 359).

The length of such a land journey as that from some of the nearest fields of its recent activity to Yunnan suggests at once the difficulties of restricting it by any public measures among nations of primitive habits. The complete absence of information about the diseases of the countries of the middle of Asia allows no tracing of the stages of this journey, if it was made.

The question of its origin locally among rats or mice, and of its extension from them to human beings, can not be accepted without much violence to settled canons of hygiene. Nor can it be dismissed without some reference to the marmots' plague (peste d'arctomys de Sibérie), which has long been recognized and regarded with suspicion. Some recent reports would appear to prove that it may be communicated to mankind from these animals (Mahé, Archiv. de Méd. nav., 1896, lxv, p. 179); but the presumption of there being a specific disease for the rodent must be determined before it can be considered to have originated plague of itself.

Probably one of the first Europeans to experience the disease in China was Rev. Father Le Guilcher, Society of Foreign Missions (Société des Missions Étrangeres), who has been a resident of Talyfou, Yunnan, since 1853. His notice of the appearance of the scourge among the people of his mission is quoted by an anonymous writer in Les Missions Catholiques, 1886, page 556. It is given from the interest that its novelty to the observer afforded in the way of independent study, there being nothing to indicate that these missionaries identified it with the plague for a long time after Father Le Guilcher's first note. In fact, the writer in the journal quoted, who signs himself "Un Missionaire," gives it as the chief of several diseases that he believed peculiar to that part of China.

"La guerre terminée," Père Le Guilcher writes in 1874, "ces pays de l'ouest éprouvèrent un autre fléau non moins terrible. Le peuple l'appelle 'maladie des rats.' Les rats commencent par être atteint d'une épidémie qui les fait mourir en masse. Au commencement du mois d'août de l'année dernière, le prêtre Paul Tohao me dit que les rats mouraient en immense quantité à Pieukio, son district. On n'y fit pas d'abord grand attention, attendu que la maladie n'était jamais apparue dans ce pays." This native preacher was one of the first attacked by the disease upon his return home, and his death was an early one upon a list that the reporter says is of an awful length.

In 1896 Father Le Guilcher supplied the following note:

> It is said that Touwensiou, who assumed the leadership of the Mohammedan revolt (against the Chinese Government) in 1856, established himself at Talyfou, the capital of Tytao. At the end of the war in 1872 the plague fell upon the country. It raged chiefly in the places that had been the scenes of hostilities; its very appearance in the country was attributed to the emanations from unburied bodies

eft along the roads. They attracted to this region a host of wolves that completed the devastation.

Other reasons have been assigned for the appearance of the plague. The war had decimated our people; many fields and rice plantations remained waste, and weeds covered these untilled lands. Rats made their homes there and multiplied prodigiously; and from living upon noxious insects they became ill of the plague, and went to human habitations, where they communicated it to man and also to the domestic animals. So the natives call this epidemic "the plague of the rats." They assert that it arose among these rodents, that died everywhere and filled houses with unbearable odors.

In spite of disinfection, the inhabitants fell ill very soon, and whole families died and often remained unburied, which did not tend to diminish the severity of the scourge. There was no longer any hope of health but in flight.

In the commencement of the epidemic the mortality was appalling and the cases were most rapid in their course. Their number increased gradually and then diminished slowly until at length, in 1896, it rages in but a small part of this country.

The buboes appeared in the groins, at the angle of the jaw, and in the armpit. On the appearance of the malady the first method of treatment employed by the natives consisted of covering the bubo with a cataplasm of onion bruised and mixed with honey. This remedy was not efficacious. They had recourse to emetics and there were a greater number of recoveries. Others burned the buboes with lamp wicks. This method of treatment cured many also, and the writer of this note owes his recovery to it.

There were in Tytao a great many cases of plague in which no buboes appeared, although the patients had all of the other symptoms of the malady. In these cases the patients expectorated blood, and I do not remember one that was ever cured. After death, in the attentions to the body, the bubo would be discovered sometimes.

The epidemic prevalence of the disease about Pakhoi in 1882 (Lowry, Imperial Chinese Maritime Customs Reports, No. 34 et seq.) is probably dependent upon the earlier operations in the Tonkin war. It is reported that the first Chinese troops sent to the frontier in 1882 were under the orders of the viceroy of Yunnan, and it is probable, therefore, that they were recruited in this province. However that may be, these troops suffered severely from the scourge, but whether they had carried it thither or whether they had encountered it there for the first time, may hardly be settled now. It is said to have prevailed in this region more than ten years before the Tonkin campaign.

Rennie's account of the outbreak at Canton in the spring of 1894 (Imperial Chinese Maritime Customs Reports, No. 48) illustrates the difficulties that appear in a matter of this kind in its simplest form. He attempts to trace the stages of the journey of the disease from Yunnan, through Pakhoi, to Canton, it being unlikely that it came directly from Yunnan to Canton, as no intermediate foci exist, save a few that are known to have come from Canton itself. It is also improbable that it came by sea from Pakhoi to Canton, because Hongkong, the most important intermediate port, was clearly infected from Canton, and because Hainan, almost a necessary place of call for junks, reported no plague until April, 1896. An overland journey from Pakhoi to Canton is thus fixed by a process of exclusion, although but little of the nature of direct evidence may be brought to bear on the question.

Rennie was unable to find either account or belief that plague had existed in China prior to 1894. There seems to be an error in Lowson's statement (Report on the Epidemic of Bubonic Plague in 1894, Hongkong, 1895, p. 1) that it prevailed at Canton in 1844.

Rennie notes that all of the descriptive names applied to this disorder about Canton were new. To be sure, it was often referred to under a general term that means *season epidemic;* but this was applied to Canton's grip epidemic a few years ago. It would be used with equal heedlessness to designate an epidemic of relapsing fever, of dengue, or of any other disease without obvious earmarks, and the account of any two of these widely differing epidemics would afford no certainty to an adept in the language that they were in any way distinguishable from one another.

At the same time it is of interest to note that two—perhaps three—of the eight Chinese terms for the plague that are given by Rennie (loc. cit.) refer to appearances that result upon slight injuries to the skin in its victims.[1] Two other are mere general terms, one which has been referred to above; one refers to its attacking rats epidemically; and two are nearly exactly translated by "bubonic plague" or by "plague with buboes." The name that it acquired in Yunnan is one of the last two, and it bids fair to become its best known name in the Cantonese dialect.

The newness and the number of these names for plague afford quite as good presumption as may be had of its recent appearance in China. To it may be added the uniform statements of the present generation of medical practitioners in that country as to their previous unacquaintance with it. All of which may with justice be held to indicate no more than that it is not at least a quickly returned visitor to China. Whether it existed at any previous time in the Empire may neither be affirmed nor denied with any gain to science.

I found, when I was in Canton in February, 1896, that its treatment was relegated almost entirely to plague doctors and doctresses; and a large, well-endowed native hospital was receiving no plague cases, but was employing these specialists to attend such unfortunates at their own homes. They were employed by the Chinese of the best class, for I learned of some cases in which regular physicians (foreigners resident in Canton) had been summoned simply to make the diagnosis of plague absolute. Some of these physicians told me that they were convinced that patients ill of other diseases than plague were kept under treatment for that disease in the large temporary hospital that was maintained by the authorities for dealing with it in Canton in the spring and summer of 1894. This shows the inability of these plague doctors to differentiate it even in a casual manner from ordinary diseases.

The fact that this hospital existed at all evinces a great concession toward Western methods concerning public health. There was little effort at isolation or at systematic disinfection, although the building was comfortable and very well kept, everything considered. The detailed treatment of the patients here would be quite profitless. Few cases of infection in attendants seem to have been observed, notwithstanding the large number of patients.

The disease was just beginning to revive about Canton at the time of my visit. There had been but a limited number of cases in the year 1895, but it had extended rather widely into the surrounding country, according to reports.

In Hongkong the inadequacy of the Chinese faculty to the demands that the 1894 epidemic had made upon it served in some measure to overcome the very strong prejudice that most Cantonese entertain regarding foreign medical ideas and practices, so that, in the comparatively small epidemic of 1896 in that city, all of the plague patients were isolated upon discovery in an institution—the Kennedytown Plague Hospital—that was entirely under the control of Europeans. In this hospital, through the courtesy of the Hongkong colonial authorities, I saw about 85 cases of the disease under the best conditions for clinical study that is afforded at present by the Chinese race. The diagnosis of death from plague was confirmed here in about 200 bodies while I was there, and I had opportunities for the observations upon them and for the few experiments with material derived from them that are given below.

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[1] As such forms of counterirritation as scratching, scraping, pinching with the fingers or even between two coins, and acupuncture, or various forms and degrees of cauterization, are standard practices for all sorts of ailments with the Chinese, the effects of the lighter measures detailed were nearly always seen in plague cases. When the skin about the throat or upon the chest had been extensively pinched, the extravasation that resulted sometimes gave startling effects even through the deep pigmentation of their skins.

The salient features of its appearance at Hongkong in the late spring of 1894, the discovery of its pathogenic organism in June of that year by Kitasato and by Yersin, the extensive measures opposed to it in Hongkong and the conspicuous absence of any such opposition to it in Canton, a much larger and possibly a more unhygienic city about 80 miles distant from Hongkong, and its subsidence after the appearance of hot and dry weather in both places require no elaboration.

The great slowness with which it spread to Macao, notwithstanding the facility of intercourse with Hongkong and with Canton, are enigmatical. It prevailed to a considerable extent in 1896, presenting mostly scattered cases, however. It spread quite extensively into the country above the city.

House to house inspections and enforced house cleanings proceeded systematically in Hongkong in 1896. They showed little abatement of the almost incredible indifference to dirt in any and all forms that characterizes Chinese life. The photographs of volunteer disinfecting parties in the Typinsan district of Hongkong in 1894 show no worse conditions than were met in other parts of the city in 1896. Much of the accumulated refuse and often the interior fittings of the houses had to be burned, and for this purpose fires were kept going for a greater part of the time at an isolated place on the water front. Houses that afforded plague patients were cleaned and disinfected at once. Those that had been severely visited in 1894 were found to furnish cases in 1896 too frequently not to raise strong presumption of the survival of the bacillus in a virulent state for that long period, but nothing stronger than the surmise was afforded by any of these instances.

Early in the outbreak of 1896 the Hongkong sanitary board undertook to isolate all of the individuals suspected of direct exposure to infection. Good-sized junks were employed to effect the segregation, and several cases developed among the persons kept on board. The plan was abandoned because the increase in the number and the wide separation of the new cases showed that the infecting material was scattered over almost the whole colony. With the native prejudice to contend against, with the consequent concealment of cases and surreptitious removal of bodies dead of it, and with a junk traffic nearly impossible of control its continuance meant only useless trouble at considerable expense.

It is said to have been introduced into An Ping, Formosa, by tea-pickers coming from Amoy, China. It was rather tardily admitted to be epidemic at the last-named place in the summer of 1896. I have no information as to the extent of its prevalence in Formosa, nor anything relating to the success of the measures instituted against it by the sanitary bureau of the department for home affairs of the Imperial

Japanese Government. While I recognize the thoroughness of the public measures of the bureau as a rule, I am inclined to think that the gravity of this occasion has been underestimated, and I fear greatly that adherence to prevailing opinions about the plague may allow the introduction of the disease into Japan proper.

A ministerial order effected the examination of all ships calling at Japanese ports from Formosa and the Pescadore Islands from May, 1896. Three cases were carried into Japan by mail steamers from Hongkong bound for the United States this year. Two of these vessels were stopped at Nagasaki, where they underwent disinfection and quarantine. The third had sailed from Yokohama before the nature of the illness of the patient, who left her surreptitiously in that port, was found out. The steamer that afforded this case had been repeatedly inspected, both in China and in Japan. Yet it is probable that this patient would have been carried to Honolulu, if it had not been for the mistrust of his fellow-passengers about the nature of his illness. The ship's surgeon had seen no plague. All of these patients were Chinese, and all of them died. At least two of them afforded the plague bacillus upon examination.

The foregoing shows that, in early stages at least, human beings infected with plague are not highly dangerous to their associates in the ordinary intercourse on shipboard. Further evidence of this fact is afforded by the case met with upon one of the flagships on the Asiatic Station and by another upon one of the naval hulks in Hongkong Harbor in the spring of 1896. Both of the patients were Chinese mess attendants that were virtually known to have received infection on shore. No infection followed the seizures on these vessels.

A case or two were carried to Singapore, where no infection is stated to have resulted. Several cases were brought into Hongkong aboard coastwise steamers that had cleared from various southern Chinese ports from Tonkin and from Cochin China. It is quite uncertain, however, as to how far this indicates the infection of these places.

The island of Hainan was declared infected on April 1, and Bankok, Siam, on April 30, 1896.

BACTERIOLOGY.

The preliminary notice that Kitasato issued (Hongkong China Mail Press, July 7, 1894) upon finding the bacillus of the plague and his communication to a Japanese publication (vide Johns Hopkins Bulletin, vol. v, p. 86) have permitted the inference that two distinct organisms are concerned with the ætiology of plague. This seems to be due to the conflicting statements that Kitasato has allowed to stand in the incomplete descriptions cited. With regard to the organism's reaction to Gram's stain these statements are noncommittal. Professor Aoyama, Kitasato's colleague in the investigations that were made for the Imperial Japanese Government at Hongkong, quotes him (Mitteilungen ueber die Pest-Epidemie in Jahre 1894 im Hongkong. Von Dr. T. Aoyama, Professor der inneren Medicin an der Universitaet zu Tokyo, Tokyo, 1895, p. 20) as saying that it was partly stained by this process; but it was stated to me in the Institute for Infectious Diseases in Tokyo, of which Kitasato is the director, that the cultures of plague bacilli preserved there were stained by it. I myself did not observe the reaction, and several applications that I made for specimens of Kitasato's cultures were ignored; but I was assured at the institute that the positive reaction of his bacillus to Gram's stain was undoubted, as it had been proved there many times over.

The cocco-bacillus figured and described by Yersin (Annales de l'Institut Pasteur, Paris, 1894, p. 662) is the organism that is accepted on all hands as the cause of the plague, and it appears to be the one to which Kitasato's descriptions apply in the main.

In bouillon it renders the medium uniformly cloudy, and there is little or no tendency to sedimentation until the culture is old. On peptone gelatin or on agaragar it grows well in whitish or grayish, moist, and somewhat thick layers. There is slight growth along the needle track in each of these media. It does not liquefy either gelatin or blood serum. It flourishes at higher room temperatures unusually well for a pathogenic organism, and it requires no preliminary treatment in a thermostat. Old colonies on agaragar show iridescence. Yersin says that such colonies present involution forms of spheroidal shape, but Kitasato says that these are common in young colonies on agaragar. These forms are common in bouillon cultures, but Yersin found that this medium did not furnish growths of sufficiently constant vigor to permit him to use it in his work of vaccinating horses to make anti-plague serum.

The organism is freely motile, and it is considered to be sporeless. It is but slightly resistant to heat, to drying, particularly in sunshine, and to the ordinary disinfectants in rather highly diluted solutions. Cultures lose their virulence after about six weeks' growth without replanting, and old cultures are frequently sterile along with whatever contaminations they may present.

The cultures that I brought to the United States were replants that I made on July 13, 1896, at Honolulu, Hawaii, through the courtesy of the Hawaiian board of health. They were derived from two cultures on agaragar prepared by Surg. M. Wilm, Imperial German navy, at the Kennedytown plague hospital at Hongkong and forwarded by him to the board. I found several of these replants and some tubes of agaragar that I had inoculated from them in San Francisco sterile when I examined them in Washington, D. C., about two months after the date given; but the agar in one of the Honolulu replants had broken, and the walls of the cleft yielded living and virulent plague organisms in another investigator's care. Some replants that I left in San Francisco flourished and retained their virulence with little or no special attentions on this head.

Pasteurization of cultures does not furnish actively poisonous toxins with this organism; hence the use of liquefied gelatin cultures in vaccinating animals to produce its antibodies. (Vide Annales de l'Institut Pasteur, Paris, 1895.)

It stains somewhat slowly and not very deeply, as compared with the pyogenic cocci with which it is very frequently associated in sections of tissues of man and of rodents. The rounded ends of the bacilli are the parts that take the stain in sections and in blood specimens. Those derived from cultures show a vacuous appearance of their middle segments when examined in hanging drops, but the reaction of this portion of the bacillus to the ordinary staining reagents is not appreciably different from that of the ends. I have not found any satisfactory evidences of a capsule. In my experience it decolorizes by Gram's method without reference to the source of given specimens.

PATHOGENESIS.

Many species of rodents have been shown to present great susceptibility to its effects; but, with the notable exception of the human family, the evidence of its constant infective powers in other orders of animals is hardly conclusive. Nearly all lay observers give many of the domestic animals as its subjects in various places without having sufficiently informed themselves as to simultaneously prevalent epidemic diseases affecting animals. There is some confusion of human plague with cattle plague (rhinderpest) by Jansen (Archiv. f. Weissenschaft. u. Prakt. Thierheilkunde. 21 Bd., 6 sec., 1895), and a similar error is attributed to Yersin from misapprehension. Rhinderpest appeared suddenly at Hongkong in the spring of 1896, and it was much discussed as bearing a possible relation to the epidemic of human plague in a popular way.

Kitasato had negative results in inoculating pigeons. Yersin found that cats reacted strongly after inoculation, but recovered. He told me that he had seen them die after eating a number of rats dead of plague, but that he had no proof of their having had this disease. A pig that he inoculated presented severe symptoms and a bubo at the point of inoculation. It recovered eventually. Lowson found that pigs showed a rise of temperature that lasted for a day or two after he had inoculated them with scrapings from the cut surfaces of imflamed and hæmorrhagic lymph nodes from human beings dead of plague. (As these lymph nodes have been shown often to contain nearly invariably pure cultures of the plague bacillus in the earlier stages of the plague infection, they were used a good many times at Hongkong as sources of supply of the virulent organism.) He found also that pigs would eat the viscera, particularly the spleens, of plague-infected animals without obvious ill effects. According to Lowson's unchallenged statement before the Hongkong local branch of the British Medical Association in March, 1896, there was little, if any, evidence that either cats or dogs had died of plague in Hongkong in 1894 or subsequently. Wilm (Report to the Hongkong Colonial Government, 1896) fed a pig forcibly with material derived from plague corpses; he found some intestinal lesions upon its death twenty-two days after the experiment. Abscesses result in horses if living cultures of the plague bacilli are introduced into the subcutaneous cellular tissue, but in such abscesses staphylococci are usually presented and not plague bacilli, although Yersin found a pure culture of plague bacilli in such a case in Paris. Infections of various kinds are invited in horses if living plague bacilli are introduced intravenously too lavishly or at too short intervals. The first intravenous injection in the course of the preparation of Yersin's antiplague serum commonly causes a purulent conjunctivitis; similarly synovitis may occur.

Two small monkeys recovered from several inoculations that I made both subcutaneously and upon mucous surfaces, the only pronounced effects being elevations of their temperatures of from 3° to 4° F. This followed also in a very marked degree upon smearing their conjunctival sacs with scrapings from plague buboes. Both of these monkeys died nearly simultaneously in my absence from Hongkong without having been further imposed upon. I was told by the ward master of the Kennedytown hospital that one of them had obtained possession of a piece of spleen from a suspected case of plague a short time before they became ill. It was taken away from the monkey very soon; but their cages adjoined and allowed them to touch one another between the bars. Their symptoms were very like those of plague, but none of their tissues were preserved. I examined a culture that Dr. Wilm had made from one of them, and it proved to be a coccus, probably one of the common pyogenic forms. I did not see any guinea pigs that contracted plague spontaneously, although several of mine died of cold and exposure to raw weather. Large, strong animals of this kind are not common at Hongkong.

Yersin has observed that flies may carry infection about with them. It is not improbable that other insects may serve a similar purpose.

PYOGENESIS AND ASSOCIATION WITH OTHER ORGANISMS.

Yersin confirmed an observation that I made that pus produced by this organism singly in human tissues is of a grayish color and peculiarly tenacious and thick. It is not by any means the rule to find such pus in cases that present suppurating buboes, but it does occur. Most frequently buboes present from the very beginning of their suppuration the association of pyogenic cocci with the plague bacilli, and they appear to exclude the specific organism more or less completely from discharging buboes after a short time. One of the definite later effects of the ptomaine of this organism would seem to be its lowering influence of the resistance of tissues against organisms that are ordinarily harmless or at least easily withstood. This is shown, I think, by the purulent ophthalmia in horses cited above and some of its sequels in man. Thus three cases were observed by me in which streptococcus infection was probable. In all of them the appearance, in a general way, was that of aggravated facial erysipelas.

Professor Aoyama seems to think this very common association of organisms constant in plague in man, or, at least, to regard the plague bacillus as nonpyogenic under all circumstances. It is undoubtedly true that it is not always nor even very frequently pyogenic; but it seems equally true that, like other pathogenic organisms now well known—e. g., bacillus typhosus—it may at times exert this influence upon human tissues.

The plague organism is usually greatly outnumbered in suppurating lymph nodes by the cocci referred to above. Once I observed numerous miliary abscesses in a kidney removed seven hours after death. Their walls were covered with bacilli resembling the colon bacillus. The organ itself had been described at the autopsy as "vascular, not cloudy; capsule easily removed," and no note was made of abnormal gross appearance.

In two small (250-gram) rabbits death followed in thirty-eight and in forty hours—from eight to ten hours earlier than in control animals inoculated subcutaneously with the same material—after I had painted scrapings from human buboes into their conjunctival sacs with the utmost care to avoid abrasions. There were no evidences here of purulent ophthalmia. Keratitis followed in each case within twenty-four hours, perhaps earlier, but it was so slight that it did not cause sufficient opacity to interfere greatly with vision, although it affected the entire cornea. It assumed merely an opalescence, which was early noticeable even by persons uninformed as to what had been done to the animals. Similar treatment of the monkeys' eyes and genitals only caused them to have slight fever for two days; and when they were inoculated subcutaneously subsequently, the temperatures did not reach quite the heights that these experiments had produced.

THE ORDINARY CHANNELS OF INFECTION.

At a meeting of the Hongkong local branch of the British Medical Association on March 13, 1896, following a paper on the manner of infection in plague by Dr. Lowson, Surg. Maj. H. E. R. James, army medical staff, stated that it was his impression from observation of the Chinese bodies in the 1894 epidemic at Hongkong that inguinal buboes were most frequent in men, axillary buboes in women, and cervical and nuchal buboes in children. This is in complete agreement with many observations elsewhere. This speaker expressed no dissent from the statement of the essayist that the genital organs admitted the infecting agent in many cases. On the contrary, he expressed the opinion that many, if not all, of the cases of infection that occurred in the volunteers engaged in the actual work of cleaning out the Chinese dwellings were open to this manner of infection. One of these men was said to have been infected through a sore on his penis; but it would appear to be unnecessary to presuppose abrasions for the entrance of this organism, at least as regards mucous surfaces. Greisinger long ago attributed the cervical buboes of children to their habit of putting things into their mouths. Touching the penis with soiled hands appears to have escaped notice hitherto as a method of infection with plague.

It seems highly probable that the greater number of the early cases in an epidemic result thus from soiled hands, and from the inoculation of more or less insignificant wounds. As the virus becomes more widely disseminated opportunities for infection per os are presented, and cases without buboes are observed. It has been quite constantly noted that these cases are rarest at the beginning of epidemics. They present a very high mortality, and, in my small experience, children made up a very considerable portion of their number. It sometimes happens that several cases of this kind will be presented by the same household. I remember two families, of two and four members, respectively, that appeared to have succumbed almost in the same hour, but on different days, to this form of plague. In some of the cases buboes may appear late in the attack; they are usually in the groin, and are composed of the lymph nodes of the femoral chain, along which the inflammation extends from the intestines through the mesenteric and retroperitoneal systems. This is most probably the explanation of Père Le Guilcher's reference to late-found buboes, and of a case that was observed by one of the physicians in Hongkong.

Two cases at Hongkong afforded some presumption that they were acquired from plague fomites. One of them was in the servant of a gentleman who did some inspecting in the infected quarter, and his clothing is assumed to have infected the man. No facts indicated infection through the respiratory passages more strongly than this incident, although the disease was often compared to typhus in public discussions relating to its mode of spread. Many patients were attended in wholly unventilated quarters without any ill effects either to the physicians or to the more constantly exposed nurses. The belief is firmly held by many lay and professional people quite familiar with the plague that the dust of the chambers of plague patients may convey infection. Dr. Lowson and Père Le Guilcher so believe; and Dr. Yersin demonstrated plague bacilli in 1894 in sweepings from a room in which one of the attendants in the American Mission Hospital in Canton had received fatal infection while waiting upon a plague case.

Frequent disinfection of the hands is credited with having kept down the number of infections among the medical men attending the patients ill of it to a proportion much below that hitherto found. Jeyes's Fluid (a proprietary article whose active ingredient is creolin in all probability) was much used in Hongkong. The attendants in the Chinese hospitals both in Canton and in Hongkong were not very frequently attacked, in spite of the comparative absence of the precautions observed by the foreigners. Many of the Chinese of the better class were buying and using Jeyes's Fluid in 1896.

Accidental inoculation is plausibly asserted for the seizures of the three Japanese medical men, one of whom died. It seems probable that they were all infected while making a post-mortem examination of a virulent plague cadaver. Two of the cases showed slight lymphangitis upon the fingers and hands. It appeared within twenty-four hours in one case, and within forty-eight hours (or a little more) in the other. There was no local reaction at the point of infection, which could be made out as a mere scratch, in the third case. In all of these cases the buboes were in the axillæ.

In these cases disinfection of the hands was too long delayed to admit of thorough cleaning of the small and unobserved wounds. Immediate attention to small abrasions that had been exposed to fluids from the organs of plague bodies appeared to have been effective in two cases in my experience.

In few of the Chinese patients was it possible to locate with any degree of precision the portal of infection. Professor Aoyama admits that his efforts in this direction were of little avail. In more than 100 cases—patients and bodies—that I examined as carefully as possible with this object in view, I found only 5 that showed ulcers or abrasions that may have served to admit the micro-organism. Various breaches in the epidermis were disregarded in this investigation, however; they did not correspond with the situation of the bubo and with other presumptive requirements. Wilm makes no attempt to locate the points of admission of the infecting agent in the 150 cases that he reports. Some useful deductions might be derived possibly from considering the locations of a large number of buboes, if complete histories and carefully kept case papers were available for each of the cases.

Yersin fed several mice together in the same cage after having inoculated some of them with plague in the usual manner, and it resulted that several of those that had not been inoculated died of the disease a little time after the death of those that he had inoculated. This experiment has been repeated lately, with the variation of having the animals live together in a jar partly filled with dry oats. The result of this modification was that only the inoculated animals died, the others remaining well. Hence I infer that the buccal and nasal secretions of infected rodents represent the sources of the infection that they spread undoubtedly, and that their mates receive infection through the buccal (or nasal) mucous surfaces. Moist surfaces would appear to favor such infection. Further, it would seem superfluous to assume that the organism multiplies necessarily in the earth, or that its virulence is increased by the soil itself independently of the moisture and of the protection that it affords in some cases.

VIRULENCE.

The first two weeks in February, 1896, showed an unmistakable decrease in the number of plague cases at Hongkong, and the most of those admitted in this period were of unusual mildness. Several of the patients had developed plague while isolated under the suspicion of exposure to infection. This light type of the disease soon disappeared, and nothing convincing was found to explain it. All of its subjects were severely ill, but the most of them recovered. Such a series of cases would have yielded very misleading results under any reasonable plan of treatment, but it happened that there were no changes of the kind made that were adequate to obscure this incident, which was not repeated in my experience.

The mortality of the cases treated at Hongkong in 1896 was about 80 per cent. This is much below the percentage of fatal cases in 1894, which Lowson gives as 93.4 per cent in the Chinese, and it is probable that it is too favorable a statement of the facts in a case where great accuracy is not attainable.

I saw nothing resembling either the light or the ambulatory plague of the text-books.

COURSE AND SYMPTOMS.

Nearly all of the cases that I saw had already reached or passed the height of the first rise of temperature, which has usually a mean elevation of about 4° or 5° F., and a range of oscillation through about 2° or 3°.

The mean elevation is usually quickly reached, and as a rule it is maintained for about three days. Its subsidence does not often amount to a complete remission, but I saw this occur once. Subsequently in nearly all cases the temperature charts show but moderate fever. The curve gives the extreme variation characteristic of pus formation when there is suppuration in the buboes, but the evacuation of pus does not remove the fever with the same promptness that follows upon this step in simple abscesses. It is irregular and quite variable after the primary rise in cases that show no suppuration, but it does not often reach the height of the maximum of this stage. Of course, individual cases may show apparent exceptions to the foregoing general statements. Composite curves could not well be constructed, because of the difficulty attending the observations of the first stages. Even histories of the cases were well-nigh inaccessible.

The face was often flushed and the eyes red, occasionally extremely red and suffused. The expression and manner frequently betokened great apprehension; but, if the patient was early delirious, his uncertain gait and hit-or-miss air very often suggested the early stage of alcoholic intoxication, especially that produced by the native beverages of the far East. Later the expression would frequently recall the heaviness of the typhoid state. Alteration of appearance proceeded in some cases with astonishing rapidity. The strength failed so rapidly that in most cases very slight restraint was sufficient to confine delirious patients to their beds, although they had been but a short time before in splendid physical condition.

The pulse is often full and bounding in the first few days of illness; its rate corresponds measurably to the height of the fever. Within the first three days it usually loses greatly in force, and in bad cases it is always either running or dicrotic. Heart failure is by far the commonest manner of death, which may supervene without long premonition through the pulse.

I did not observe any spots on the skin (the plague tokens of early English accounts of plague), except a few that appeared to have followed accidental injuries. Of course, nearly all of the Chinese patients showed the extravasations consequent upon the counterirritation that they usually inflict. The absence of the spots described by Lowson and by Aoyama coincides with the absence of flies and mosquitoes. This susceptibility of the skin to yield extravasations upon trifling injuries is a feature of this malady that is little emphasized but very unique. There appears to be a tendency for wounds to bleed quite freely in the stage of plague in which extravasations occur. This stage is always an early one, and it does not appear to be long continued. I have not found it to persist after suppuration is established.

Spontaneous oozing of blood from the noses and mouths of plague bodies is said to have been very common in the epidemic of 1894. I saw but little of this in 1896, but on several occasions I noticed that much blood flowed from divided veins in bodies that had been dead for hours. In two cases I was much surprised at the rapidity with which the dark brownish-red color of the cut surface of the spleen changed to a most vivid scarlet hue. Both of these observations were made at autopsies shortly after death.

Cyanosis was frequently exhibited in bodies several hours after death. The transportation of affected individuals often brought about striking manifestations of the altered blood state and the circulatory difficulties.

Dyspnœa is an early symptom. It would appear to depend, as does the respiration in fever generally, somewhat upon the height of the temperature in a given case. Doubtless the pronounced sapræmia and the nearly constant meningitis that depends upon it bear the larger part in causing it. In advanced cases it is assisted by hypostatic congestion of the lungs. Cough was not a common symptom in my experience. I did not observe either lobar or lobular pneumonia in pronounced type, nor did bronchitis seem to be as frequently associated with plague as the common prevalence of bronchial catarrh in the Chinese past middle age would have suggested. I saw some blood-stained sputum from cases that had pulmonary œdema. Some other cases had streaks of blood in their expectoration occasionally, but I saw no declared hæmoptysis. Wilm claims that he could demonstrate plague bacilli in the bronchial mucous membrane, but he could not exclude the blood as the source of the organisms that were morphologically like the plague bacillus in the experiments on this head that he made in my presence.

Complete anorexia is usually found. Sometimes it was ascribed to epigastric uneasiness. Thirst is not prominent as a symptom. Vomiting was present in a small proportion of cases only. In several cases that were considered to have been infected by way of the intestinal tract, grumous material showing hæmin crystals and containing altered red blood corpuscles and swollen leucocytes was vomited shortly before death. Several other such cases showed the same material in the stomach upon autopsy. Professor Aoyama and Mahé (Archiv. de Méd. nav., 1896, lxv, p. 85) each notes this vomiting of altered blood. The latter mentions the enforced suggestion of the familiar Spanish term that applied to like material in yellow fever—vomito negro.

At first the tongue is fully and evenly coated with a light whitish-colored fur that extends quite close to its borders. The color of this coat changes gradually and often rapidly through yellow to a brown or even to an almost black color. As the color deepens the coat recedes somewhat from the edges of the member in most cases, but they do not redden nor become very dry. The coating is not thick, unless it receive additions from sordes in the very bad cases, which may rival the worst conditions presented by typhoid cases. Inflammation of the pharynx and of the tonsils was frequently seen. A few cases were almost unable to swallow from trouble of this kind.

Systolic heart murmurs were at times quite early in appearing, and they were often pronounced in character. Pericardial murmurs were found less commonly. Thrills were very marked in a few cases, notwithstanding the absence of inflammatory signs in all cases at postmortem inspection.

The spleen was practically always palpable under fair conditions. I never saw it greatly enlarged from engorgement in acute plague. While it is constantly enlarged in this disease, I doubt if it is ever doubled in size under its influence alone. In some cases its corpuscles were unusually plain to be seen. It seemed nearly always very friable, and it was often diffluent.

The liver often appeared to be somewhat enlarged. The gall bladder was usually full of dark-colored bile. Slight catarrhal jaundice was very common.

The urine appeared diminished with some reference to the height of the fever. It contained a little (rarely more than 1/20 by bulk after coagulation) albumin in all of the 23 cases—with two exceptions—that I examined for it in the course of the first rise of temperature. Both of these cases were deeply jaundiced, and the urine showed much bile pigment. Each of the patients had an axillary bubo, and one showed very extensive phlegmonous mischief, that extended from below his nipple to his ear on the right side. There was a good deal of a turbid straw-colored fluid in the pleural cavity of that side, but the liver was normal to gross inspection and the common bile duct was unobstructed.

Indican appeared to be nearly constant in the urine in these cases. In two that presented extension of the specific inflammation to other lymph nodes than those associated with the buboes, indican reappeared, and again declined with the subsidence of the secondary inflammation. Neither of these cases had any declared suppuration, and a considerable interval elapsed in each before the secondary attack set in. It returned similarly in a case where acute mania interrupted convalescence temporarily. Free purgation did not materially reduce its amount in any of 6 cases examined with reference to this possible modifying influence.

The diazo reaction gave no satisfactory results in my hands. That is to say, that nearly every specimen of urine that I tried gave the port-wine color with the chemicals that I employed.

Granular casts were found in all of the half dozen specimens from different cases that I examined. Many of them stained as if they were composed of nuclear material. Hyaline casts were infrequent in these specimens.

Glycosuria was found in a case that presented erysipelatous inflammation of the face with bullæ. The sugar persisted for less than a week, and it was in comparatively small amount at the worst.

The urine and fæces are said to have been often voided spontaneously just before dissolution; otherwise these symptoms seem to have been much less frequently manifested than in 1894. Retention of urine was noticed a few times about the end of the first week.

Constipation is to be expected at the outset. It was usually attacked in the course of the treatment. There appeared to be a tendency of some uniformity toward diarrhœa in some severe cases that recovered.

I saw only inguinal, femoral, axillary, cubital, cervical, and nuchal buboes, but extension of the specific inflammation often caused other enlargements that were not of great size. In the bodies of two children without histories hæmorrhagic buboes appeared to involve the parotid glandular tissue. This fact was not proved fully, and I did not observe the implication of salivary glands with certainty in any other cases.

In their earlier stages these initially affected lymph nodes were usually painful to deep pressure, a condition that influenced the position in which an affected limb was kept. It was, as a rule, only in children and in lean individuals that relatively correct ideas of the sizes of the enlarged masses could be gained by palpation. No very large buboes were presented while I was about Hongkong. I saw but few single lymph nodes larger than 50 millimeters in their long diameters, but in a few cases agglomerated nodes made a large mass in the groin. There was an old man in the Kennedytown plague hospital at the time of my first visit there whose inguinal bubo had sloughed out en masse, leaving a clean, granulating excavation of oval shape about 10 by 6 centimeters in extent. Frequently the node or nodes composing the bubo were early masked to palpation by exudation and œdema. These conditions attended both the mild and the severe cases, but when resolution of a bubo had definitely begun the softening of the bubo was easily appreciated. In many cases that were early fatal the buboes were permeated with a straw-colored serum that infiltrated the tissues for some distance about them, and in some of the worst cases there was intense phlegmonous inflammation with the formation of extensive sloughs. I found that the superficial inguinal chains were affected in the greatest number of cases; next in the order of frequency came the femoral chains, and after them the axillary, cervical, nuchal, and cubital regions, in the order named.

I did not observe the origin of any buboes late in the course of the primary fever, but a case of this kind occurred in the practice of a physician in Hongkong while I was there. He excised post-mortem an enlarged lymph node that had presented in the femoral chain below the fold of the groin only a few hours before death, and it was found to be hæmorrhagic and to contain many plague bacilli. Although no other post-mortem examination than that indicated was made, I believe that this case was one of extension of the specific inflammation of plague from the intestinal tract centripetally, as Wilm expresses it. The case is of interest further as showing that the blood may not yield positive indications of indubitable plague to such careful and repeated examinations as are to be expected of a general practitioner. Another case similar to the foregoing, but without the enlarged lymph node to assist in the diagnosis, occurred about the same time in the servant of another practitioner at Hongkong. Examinations of the blood were negative in this case also.

In several cases that I examined post-mortem no buboes were apparent, but the number of mesenteric and retroperitoneal glands enlarged to various sizes under 10 millimeters in their long diameters was astonishing. In two of these cases—both in children under 10 years of age—the mesentery itself appeared at a little distance much like a screen made of different sizes of opaque glass beads. A few of the largest of these glands showed small hæmorrhages in their centers, but such manifestations were much more common in the retroperitoneal and femoral chains. I saw petechial hæmorrhages in many mucous surfaces, and several women showed more extensive mischief of the kinds in their pelvic organs. Metrorrhagia did not seem to be frequent, and several pregnant women had died of the disease without aborting.

Ordinarily the glands not connected with the group presenting the bubo are moderately enlarged; but they rarely or never show hæmorrhages within themselves, and their color does not approach the port-wine hue of a gland that receives the full effects of an attack by the organism of plague. It was considered sufficient for the anatomical diagnosis of plague at Hongkong, even in the absence of history and account of symptoms, to find a lymph node considerably enlarged and hæmorrhagic about its center. At the same time the lymph nodes generally would usually be more apparent to gross inspection than normal. In some mild cases the extension of the inflammation to a number of lymphatic glands has been observed clinically.

It seems most consonant with our present knowledge of general infectious processes to consider the bubo (or the infected prima via) as the local lesion and place of manufacture of the toxin or toxins that so early attack the capillary system, the meninges, and the muscular tone of the heart. This view of the process intentionally subordinates the pathological importance of the fact of the presence of the bacillus of plague in the blood and in the tissues elsewhere than the point first attacked.

THE PLAGUE BACILLUS AS AN AID TO DIAGNOSIS.

As I have indicated, it is very likely that all cases of plague do not present the bacilli in the blood in sufficient numbers to enable one to reach a positive diagnosis.

General considerations of the motility of the plague organism and of the success of its anti-bodies in Yersin's hands add much to the probability of the discovery of some practicable form of Widal's reaction that will determine its presence unequivocally.

THE SOURCES OF DANGER FROM PLAGUE PATIENTS.

Professor Aoyama concludes that it is unlikely that the plague bacillus leaves the human body in any state capable of infecting other individuals. In many cases, owing to the rapid course of the disease and to the situation of the spot in which the poison that kills is elaborated, it may be readily granted that it does not. But such is hardly the case with regard to the black vomit that he and Mahé mention; and it seems very probable that the urine may contain at least a few virulent bacilli, if it be derived from cases with hæmorrhages into the pelves of the kidneys, lesions that the former has noted. The infectious character of the sputum and of fæces seems probable also; but Wilm's experiments require confirmation from his poor facilities for making plate cultures. The same qualifications apply equally to his examinations of blood, saliva, etc.

With virulent plague organisms present, abrasion of the mucous surfaces are hardly necessary to permit infection through them, in view of my experiments with the rabbits' eyes and of the numerous feeding experiments of Yersin, Kitasato, and Lowson. Besides, it is surely too much of a restriction of the oportunities of which we know that this organism avails itself to require that this but slightly resistent organism should owe the most of its opportunities to infect to such fortuitous matters as favorably situated abrasions. There is much evidence to support the assumption that the bacillus of glanders does not require abrasions in mucous membranes, in order to infect human beings, at least. At present one is impelled to assign the more important rôle in its diffusion to rats, mice, flies, and, perhaps, to some as yet undetected agents of this sort; but it is surely unwise to despise the dangers that infected human beings may afford.

PROPHYLAXIS AND GENERAL MANAGEMENT.

Provided with hitherto nonexistent knowledge of its cause and with many essential facts in its life history confirmed by practical tests, many factors that can not have failed to influence unfavorably earlier dealings with this scourge disappear almost magically to-day. It is doubtless true, as is possibly too prominently urged for perfect safety, that the improved status of the public health of most civilized countries would be unfavorable to its wide prevalence, if it should be introduced. It is assuredly not far from demonstrable truth, nevertheless, that the nation that is the least deserving of all of reproach for lack of practical public spirit has still some districts in which it might retain a foothold if it once were gained.

The military experiences that the Egyptian campaigns in the early years of this century afforded should be supplemented with many favorable results now. The chief reliance then was the early segregation of those affected (The Prevention of Disease in Tropical Campaigns, Andrew Duncan, London, 1889, p. 241); thorough and frequently repeated inspections may be necessary to effect this object. The instances cited on board the ships at Hongkong confirm in a measure the value of this procedure.

Disinfection of buildings, fomites, and the like, should be easy from the observed low vitality of the plague organism. However, experience has shown repeatedly within the past two years that such measures must be most carefully complete. Gaseous disinfection, as ordinarily practiced, should not be relied upon, in my opinion; and the precautions taken should be as exhaustive at least as those applied to cholera-infected houses. Abandonment had to be resorted to in more than one instance in Hongkong, in order to stop the extension of plague among the inmates of quarters that offered very few inherently objectionable characters indeed.

Success in limiting its prevalence in bodies of people such as steerage passengers or troops will depend with certainty upon the completeness of their isolation. Members of the crews of more than one mail steamer acquired the disease in Hongkong Harbor, in spite of strict confinement to their respective ships.

A great danger presented by maritime traffic is in the transportation of fomites and of textile articles, particularly those made by low-class hand workers or exposed otherwise to handling in the houses of the very poor. Coolies, pilgrims, and emigrants afford the double danger of carrying the disease with their persons or in their baggage. Still, plague does not appear recently to have affected a considerable portion of the crew or of the passengers of a ship in the course of a voyage. It would seem that the conditions on shipboard are, upon the whole, unfavorable, if one considers the few cases that have resulted out of the numerous opportunities that must have arisen. Quite a grave danger exists in the probability, however remote, of the transference of a mild case of plague from a ship into the care of persons uninformed as to the characteristics of such cases. Such a case would be very apt to show suppurating lymph nodes; and the routine measures of antiseptic surgery would of themselves greatly reduce the risk. Notwithstanding the common disappearance of plague bacilli from such discharges and the effectiveness of antiseptic precautions, such unrecognized cases still have great menace.

TREATMENT.

The only specific remedy that is known to have afforded encouraging results is the antiplague serum, which is due to the admirable researches of Dr. Yersin, director of the Pasteur Institute at Nha Trang, Annam. The history of its method of preparation and of its first application to the cure of this malady, the most fatal epidemic disease that afflicts mankind, is given in the Annales de l'Institut Pasteur, Paris, July, 1895, and January, 1897. Three cases were treated by Dr. Yersin in Canton in June, 1896, and 23 in Amoy a little time later. As only three cases out of the entire number treated proved fatal, it will be seen that this remedy has effected an exchange of the figures applied hitherto to the percentages of deaths and of recoveries. These general results were announced to me by Dr. Yersin in a personal letter from Hongkong on July 21, 1896.

It is Dr. Yersin's opinion that an early resort to his serum will arrest the specific process and forestall the common heart failure in nearly all cases of plague with the utmost promptitude. It is powerless in the presence of this heart weakness, which seems well nigh irremediable. The serum will have to be used in most cases therefore in the first two or three days of the disease, in order to avoid this tendency to death as well as to anticipate destructive changes in the buboes. They are said to soften and to disappear very rapidly under the influence of the remedy; but it seems unlikely that it will be found to shorten the duration of suppurative cases that are rather a sequel to plague than a form of it.

The dose of the serum is from 30 to 60 cubic centimeters *sub cute.* The suppurating cases respond with reasonably gratifying results to generous supporting and stimulating measures. Of course these agents must be additional to such surgical procedures as are necessary to limit suppurative mischief wherever it is met with, and to obviate its results. By far the greatest number of recoveries that I observed in Hongkong owed the most to the association of these measures.

It is highly probable that the careful nursing that specific infectious cases receive at the present time almost everywhere would, in a great measure, reduce the mortality that is expected when plague seizes upon great numbers of superstitious and fatalistic people who are without the spirit to oppose it steadfastly. The entire absence of suitable food in many cases, and the awful condition that the mouths of its victims often showed, seemed almost enough to have caused death of themselves without the assistance of an active poison.

Convalescence in these cases of spontaneous recovery was often protracted, and the return to ordinary diet had to be managed very carefully.

It suggested itself to me upon observing the infiltration that precedes the resolution of the bubo that the destruction of this local lesion by means of the Pacquelin cautery might be a justifiable procedure under certain conditions. This plan would require an early application in every case not to be actually hurtful, for it could not be applied well without general anæsthesia, and it would be only in the initial febrile stage that the danger from the anæsthetic and from the shock could be incurred reasonably. The advantages of the cautery are comprised in its disinfectant action upon the eschar, in the absence of hemorrhage, to which there is predisposition in the early stage of plague, and in the barrier action of the inflammation that would follow the cauterization. My excuse for detailing this speculative matter is that Haecker (The Black Death) notices with commendation only the treatment with the actual cautery.

Early incision of the bubo with the application of moist antiseptic (carbolic acid solution) dressings was proposed in 1894 at Hongkong; but I could not learn if the plan was put into practice. Professor Aoyama notes that two patients recovered after he had injected solution of carbolic acid into their buboes.

APPENDIX NO. 1.

REPORT ON CHOLERA IN JAPAN.

The Nagahama quarantine station was made ready for extra work with cholera in connection with the Japanese navy on April 5, 1895, under the direction of Mr. Yoshida; the chief of police of Kanagawa ken.

The buildings at the former quarantine station of Nagaura were removed to Nagahama in 1894, and additions had been completed early in 1895 that made it a very efficient, comfortable, and most picturesque establishment. It lies about 12½ miles south of Yokohama, in a spot sheltered by ranges of hills on the southwest and on the north. It faces Yeddo Bay on the east. The grounds embrace about 500,000 square feet and they contain 34 wooden buildings. The total cost of the establishment was about 117,000 yen, approximately $58,500.

On April 25, 1895, it was made a subsidiary station of the special quarantine department of the imperial Japanese army. The director was an army surgeon "of the third grade," and the staff was composed of 3 officers, 86 noncommissioned officers and privates. Besides there were 46 coolies as a working force.

A lookout ship with inspecting officers, quarantine physician, and pilot lay off the main ship channel in the bay from April 11, but it was not until early in July that it was necessary to detain or to disinfect any ships.

The period of active work for this station was 250 days, in which time 1,709 ships were boarded, examined, and inspected. Of 29 vessels that came from cholera-infected places, 22 were quarantined and disinfected; 8 of this number had cholera actually on board, presenting in all 18 patients and 2 bodies.

At the Shimonoseki (civil) station 86 ships and 34,949 persons were passed upon before the equipment of the Hikoshima station. Up to December 17, 1895, 451 vessels had been boarded and examined. About 175 cases of cholera were seen here in 1895.

At Wada Point (Kobe) 24 vessels, carrying 6,205 persons, were examined for the army quarantine department before May 31, 1896. More than 185 vessels were overhauled at this station; 22 were disinfected, and 11 were detained. Four thousand five hundred and seventy-one ships were boarded and observed and 2,556 cargoes were disinfected. There were 69 cases and 45 deaths from 8,245 people disinfected, 3,185 of whom were detained. Disinfection was applied to 40,279 articles of wearing apparel.

Much work of which I received no detailed accounts was done at the home department's stations at Nagasaki and at other places.

APPENDIX NO. 2.[1]

SPECIAL ARMY QUARANTINE DEPARTMENT.

(A) Disinfection: A translation of the work of Professor Pfuhl, staff surgeon imperial German army, on that subject. The chapter on ship hygiene is by Dr. Nocht, imperial German navy, port surgeon of Hamburg.

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[1] Books, plans, etc., referred to in this Appendix, have been placed in library of Naval Museum of Hygiene.

(B) Essential Points about Cholera Epidemics: A translation of Pfuhl's Lectures at the Institute for Infectious Diseases in Berlin, 1893.

(C) Individual Duties of Officers (at army quarantine stations):

I. The superintendent directs subordinate officers, the quarantine hospital, and supervises all quarantine duties. He is responsible to the head of the army quarantine department.

II. He is to distribute the duties of the subordinate officers.

III. He can, if necessary, send out on duty any subordinate officer.

IV. The officer next in rank is the successor in all the duties of the superintendent or director.

V. The quarantine department is subdivided into:

1. Superintendent's department.
2. Quarantine examination of ships.
3. Transportation.
4. Disinfection by chemicals.
5. Disinfection by steam.
6. Burning infected articles.
7. Bathing persons exposed.
8. Disinfection of ships.
9. Detention of ships.

VI. The superintendent is the director of the whole establishment.

VII. The superintendent's office is subdivided into business, treasury, observation, and electrical offices.

VIII. The business office deals with records, reports, correspondence, and all similar matters.

IX. The treasury office is concerned with the salaries of all employees, the purchase of all required articles, and with their preservation; with all invoices, charges, and with every other matter relating to money.

X. The observation office is to note the entrance of all vessels, and when ordered to do so must make report to the ships' quarantine office (2 ante and XII post).

XI. The electrical office deals only with the telegraph, telephones, electric lights, and with their repairs.

XII. The ships' quarantine office, transportation, disinfection, both by chemicals and by steam, burning suspected articles, bathing persons exposed to infection, and the disinfection of ships are all managed under the army quarantine regulations (N post).

XIII. If several offices have to deal simultaneously with a matter, and if this matter concerns one of them more than any of the other offices, then the head of that office shall direct the whole affair.

XIV. Besides the regular reports required by regulations, the superintendent (director) shall have the right to require special reports from any of his subordinates at any time upon any subject with which they are concerned.

Quarantine hospital.

I. Its director shall superintend it under the director of quarantine.

II to IV, inclusive. The same as similarly numbered sections of "Duties of officers," supra.

V. The departments of the hospital are those of business, the wards, detention wards, convalescents' wards, and dispensary.

VI. The business office is to be directed by the director of the hospital.

VII. It will consist of the clerical and of the treasury department.

VIII. The clerical department will deal with records, reports, intelligences, and with all other duties assigned to it.

IX. The treasury department will disburse salaries, pay employees, purchase supplies, preserve invoices of all property under cognizance, and accounts of all contracts, promises, and other obligations.

X. There shall be wards for: (1) cholera; (2) typhoid fever; (3) dysentery; (4) typhus; (5) smallpox; (6) bubonic plague. The staffs of each of these wards will attend to patients, to dead bodies, and to articles for disinfection in the wards.

XI. The detention wards are to hold persons suspected of exposure to the six diseases enumerated above.

XII. The convalescents' wards are to admit convalescents from the six diseases named above after the danger of infection is past.

XIII. The dispensary deals with drugs and with the preparation and care of instruments.

XIV and XV. (Are identical in tenor with the concluding sections of "Individual duties of officers."—W. F. A).

(D) The Practice of Disinfection: By Vice-Director Goto, special army quarantine department, director central sanitary bureau, etc.

The three principal methods are by destruction by fire, by steam, and by chemicals. Supplementary means are by aeration, by sunlight, and by dessication.

I Burning is applicable to: (1) excreta of infected persons; (2) clothing, bedding, etc., of infected persons, made valueless by soiling: (3) utensils and other personal articles that are inexpensive and that are much soiled by their infected owners. *Nota bene.*—Before burning clothing, examine the pockets well for cartridges. Sprinkling condemned clothing with a disinfectant solution should be practiced for the sake of protecting the persons carrying out the disinfecting measures.

It is advisable at times to bury excreta and vomita. Under such circumstances, add to them one-tenth of their bulk of milk of lime or one-fifth of their bulk of a 5 per cent solution of carbolic acid. These should be well stirred into the mass to be buried.

II. Steam. It is applicable to articles made of silk, cotton, linen, wool, paper, glass, porcelain, and to certain manufactures of wood and of metals. *Nota bene.*—Search the articles well for cartridges, matches, and other explosive or easily inflammable articles. It is not applicable to articles made of leather, lacquer, hard rubber, glue, furs, ivory, tortoise shell, and to certain manufactures of wood and of metals.

Articles stained with blood, if of sufficient value to be cleaned of such stains, should not be steamed until after the treatment recommended below has been adopted; steaming may even be obviated by the process. (The process is not given in any of Japanese books.—W. F. A.)

The apparatus for disinfecting by steam consists of a steam boiler and of a disinfection chamber. (Here follows some very obvious directions regarding the care of the boiler, chimney, etc.—W. F. A.) An automatic whistle gives notice of a pressure of 35 pounds, at which signal steam is ready for the disinfection chamber, and the fact should be communicated to the disinfection room.

The disinfection chamber is a cylindroid affair, made of boiler iron, placed with its bore horizontal and with the principal axis of its oval section vertical. Its two ends are closed tightly with iron doors, the weight of which are supported by rollers. Articles for disinfection are pushed into one end and pulled out at the other after the disinfection is completed. This is facilitated by a system of trucks and rails. There is a metal jacket to the chamber for the purpose of economizing heat. Separate managers are necessary for the opposite sides of the disinfection room, and no intercommunication should be possible, except through the disinfection chamber itself.

The pressure inside the jacket of the chamber is kept at 3 pounds. The basket containing the articles for disinfection is then introduced, and the air is blown out by the steam as the doors are closing. The steam is conducted into the chamber for the required time, which varies with regard to the particular plant and the articles to be disinfected. It must be specially determined in each case.

Superheated steam would injure the articles under treatment, and it is not so effective as steam of expansibility of from $\frac{1}{5}$ to $\frac{1}{20}$ above normal. It should be conducted into the chamber from above, and if the thermometer with which each chamber is fitted indicates a lower temperature than the pressure gauge would lead one to expect, it is evident that the air has not been expelled thoroughly from the chamber. This admixture of air very greatly reduces the efficiency of the process. Directions for securing motion of the steam in the chamber should be posted up in the disinfecting room of each station.

Clothing should not be wet upon emergence from the chamber. With an expansion of $\frac{1}{5}$ above normal and with a temperature of 102.5° C., one hour's exposure is ordinarily sufficient, with the limitations noted above. (Twenty minutes' exposure was shown to be ample by Kitasato at Ninoshima by actual test, and this was the length of the actual exposure under proper conditions.—W. F. A.)

III. Disinfection by chemicals is applicable to articles made of leather, lacquer, tortoise shell, hard rubber, to furs, ivory ware, and to some manufactures of wood and of metals, to houses, to ships and their bilges, and to articles that stain (or to colors that "run") under the use of steam.

Disinfectants.—Solution of corrosive sublimate, strength 1:1,000; add hydrochloric acid 1 per cent and color with fuchsin. There is no objection to using sea water for corrosive sublimate solution when the scarcity of fresh water is great.

2. Solution of carbolic acid, strength 5 per cent (1:20); sometimes 2 per cent.

3. Quicklime in powder. Milk of lime, strength 1:4, or 1:10. For bilges and for washing purposes a strength of 1 per cent is used.

It is often convenient to prepare saturated solutions of disinfectants, and to dilute them upon occasions for use.

Corrosive sublimate is very poisonous and it spoils many articles. It must usually be washed out with fresh water, and it is inapplicable to dejections. Carbolic acid is neither so hurtful nor so poisonous.

Conclusions.—Leather articles and the other things noted as injured by steam are first to be washed with soap and water and then in carbolic solution. Metals in the same way, or merely wiped with cloths wet in carbolic solution.

Wooden ware, houses, and ships are amenable to disinfection with any of the foregoing. If corrosive sublimate be used in an iron ship it must be well washed out with salt water. The strength of the residue may be tested with a copper coin, which will show reduced mercury in any solution of disinfecting power.

Milk of lime, properly used, is safer and more efficacious. Avoid the precipitation of lime in ships' bilges.

(E) A Guide to General Quarantine Stations. (This purports to be a plan of the stations at Ninoshima and at Sakurajima; but it by no means represents actualities at the former place. It seems to be an enlarged plan modeled upon one given in A, ante. Three hundred thousand copies of this publication were distributed to the troops in China before their embarkation to return to Japan.—W. F. A.)

The shaded parts of the plan are the nondisinfected places.

The courses followed by persons, clothing, etc., are shown by the red arrows.

All rooms are plainly marked with a title board, and the persons in charge of them are designated by badges that correspond. They are ship examination, transportation, disinfection by chemicals, steam sterilization, destruction by fire, bathing individuals exposed, observation, baggage, waiting, bathing, resting, enrobing, valuables, office of ship disinfection, and detention wards.

On approaching a port where disembarkation is anticipated every person should remain at his assigned post. Isolation of all cases by the quarantine officers should be facilitated. All clothing should be made into bundles—one for every individual—for delivery to the transportation department's agents for disinfection.

Disinfection is not hurtful to individuals in any way.

Valuables should be looked out for as far as may be by divisional officers in command of the troops (or coolies), unless they are thought by the quarantine officials to carry infection.

The purpose of general disinfection is to prevent transference of epidemic diseases. As it is for the good of the public, honesty and good disposition toward its object are necessary. Everyone must consider that he is in a position of trust in which deceit is not patriotic.

Naturally the duties of the quarantine officers cause trouble and inconvenience, and discussion with them is to be avoided. The head of each division is responsible for the conduct of his command.

Routine of disinfection.—The accouterments must be left in the baggage room, and the quarantine authorities are not responsible for any carelessness with regard to them.

Formation in parties of 70 (one-third of a company), to each man of which is given a ring for the finger bearing a number and two checks numbered to correspond with the ring. This must be borne in mind, as the whole process turns on the numbers, and the ring must not be lost. There is no such a thing as rank during the process of disinfection.

Cord will be supplied for tying up the clothing into a compact bundle after removal from the person. These bundles, each bearing a check corresponding with the number of its owner's ring, are to be placed in the baskets of the disinfection chambers. (These were of galvanized iron. There was, at first, some trouble from oxidation in the course of the process, but the zinc obviated it.—W. F. A.)

The time for the bath is twenty minutes.

The disinfected clothing will be issued from a rack in the enrobing room, which will have compartments numbered to correspond with the bather's ring. The bathing gowns issued to everyone upon emergence from the bathroom should be placed in the rack from which the disinfected clothing is received. The disinfected accouterments will be issued from the baggage room to the men in the detention wards by orderlies detailed for the purpose.

The second check is to distinguish the personal valuables, etc.

(F) A Scheme of the Track of Infected Persons, Bodies Dead of Infectious Diseases and for Baggage at a Quarantine Station. (This diagrammatic affair was very effectively used by Vice-Director Goto, to explain the plan of the department's work to nonprofessional individuals.—W. F. A.)

(G) Directions for Preserving Health. (A simple pamphlet, very widely distributed among the soldiers; its author is not given.—W. F. A.) It emphasizes the enfeeblement of digestion that obtains in hot weather, and it cautions on that single account against things uncooked, mollusks, unripe fruit, unboiled water, etc. It urges avoidance of excessive use of tea and of sake.

(H) (A plan of Vice-Director Goto's steam sterilizer for use aboard ship. The letterpress relates principally to the difficulties of limiting the spread of infectious diseases and to the importance of preventive measures. I did not learn of the use of this machine.—W. F. A.)

(I) Form for Recording Daily, Monthly, and Complete Reports of Infectious Diseases. (On it and on all the other forms the headings, etc., are translated.—W. F. A.)

(J) Form for Inspection of Ships, with Full Reports of Voyage (see N).

(K) Form for Inspection of Ships in duplicate.

(L) Practice of Ship Disinfection. By Vice-Director Goto. (A treatise for soldiers employed in quarantine stations.)

Preface.—Life on board ship being entirely different from that on land, in order intelligently to carry out inspection and disinfection it is desirable that a general idea of the construction of ships be imparted to the soldiers engaged in the work of quarantine. To train them practically in such matters the books in existence will not allow, from their voluminous and technical character. For the full elucidation of the theory and practice of disinfection reference is made to the work Disinfection (A, ante). (Signed) Goto, vice-director of the quarantine service, May 25, 1895.

1. How are officers and subordinates introduced into inspecting and disinfecting the various parts of a ship?

Usually a ship is divided into four main portions; therefore in cleaning and disinfecting large ships the officers and subordinates are to be divided into four divisions.

2. How many persons are necessary to disinfect a ship of over 1,000 tons burden?

This depends largely upon her construction. Usually 100 persons can disinfect a ship of that size or larger in from three to four hours. It is advised to consult in all cases with the captain of the ship concerned and to get the crew to join in the work. Their knowledge of the ship will facilitate the disinfection to a very great extent.

3. If it is intended to disinfect only such portions of the ship as have been contaminated, a force of about 40 in the disinfecting corps will be sufficient to execute the work in from two to three hours. Even in such cases it is advisable to ask the captain for the cooperation of the sailors. He should also be fully acquainted with the duties of the officers of the quarantine corps; and he should be requested to order his subordinates to afford all possible advantages to them and all information in regard to the construction of the ship.

4. The first officer is usually charged with the supervision of cleaning and disinfecting the ship.

5. Sailors' and firemen's rooms, the peaks, the bilge spaces, and the kitchen (galley) are usually the dirtiest places in a ship. (It will be seen that ballast is utterly neglected by this writer.—W. F. A.)

6. Peaks are forward and aft in ships, and are usually kept as storerooms for articles used in navigating.

7. Bilge spaces are at the bottom of the ship inside, and are spaces into which all of the filthy water collects. It is provided with one or more pumps, operated either by hand or by steam, or else the bilge water collects in a well under the engine room. When there is no pump to empty the bilge, the filthy bilge water must be bucketed out.

8. In ships with double bottoms the bilge spaces are on both sides of the keel, connected with each other. In single-bottom ships they are on each side of the keel, and they are separate. In the latter the disinfection of the bilge is more difficult.

9. Communications between bilge spaces that can be opened or closed from the deck are called drains.

10. Bulkheads are (iron) partitions that divide the body of the ship into separate compartments.

11. Hair brooms, Para brooms, deck squeegees, China brooms, swabs, scouring brushes, wire brushes, flax swabs, coir brushes, dust brushes, brushes with handles, force pumps, buckets, and washtubs are required in disinfecting ships.

12. As most ships are made of iron, strong acids and corrosive chemicals can not be used. Corrosive sublimate must be avoided altogether, if possible. After its use thorough washing is always necessary. Where such washing can not be carried out, milk of lime should be substituted.

13. After disinfection of passengers' rooms detachable articles should be brought out and washed and the room thoroughly scrubbed with sea water and wiped dry. Soiled places must be scrubbed with a coarse brush.

14. In washing decks use the deck-flushing pump.

15. Scuppers are channels for carrying water off from the deck. During deck

scrubbing one must have them opened. On the lowermost decks the scuppers lead into the bilges from both sides of the decks.

16. Air ports are small windows in staterooms or other living spaces.

17. A hatch is a square opening in a deck, usually for admitting cargo.

18. Cargo ports are doorways in the sides of a ship for handling cargo.

19. During inspection and disinfection air and cargo ports and hatches must be kept open for ventilation.

20. Wind sails are made of canvas, and are used to conduct air into the lower compartments. They must be used during disinfection.

21. Ventilators are iron pipes used for the same purpose.

22. Carpets may be disinfected by steam. Oilcloths may be disinfected by wiping with carbolic-acid solution.

23. Ships undergoing disinfection at quarantine stations must be cleaned. Bilge spaces must be attended to.

24. Bilge-space cleaning will require the cooperation of the officers and crew of the ship. Their activities must of course be directed by the quarantine officers.

25. Ships detained in quarantine shall be somewhat disinfected, and shall have their bilge spaces reasonably attended to.

26. The quarantine officer in charge shall determine from the state of the bilge water the advisability of having the bilges disinfected.

27. The details of the disinfection of the bilges must be settled according to the construction of the vessel, having some deference to the experience and opinion of the first officer of the ship.

28. Where there have been cases of an infectious disease, places suspected of contamination should be washed with strong solution of carbolic acid (1:20) or smeared with milk of lime, care being taken not to raise dust in the process. Sprinkle or spray carbolic acid beforehand, if needed.

(M) Appendix to Practice of Ship Disinfection.

1. In order to disinfect the walls and floors of compartments without ornamentation, stairways, etc., it is best to rub them all over with milk of lime (1:4) and to wash off the lime after twenty-four hours. For washing purposes make a milk of lime (1:10) and dilute it with nine volumes of water.

2. Compartments with ornamentation and articles of decorative uses, as pictures, etc., found to need disinfection, must be wiped over with a cloth wet in 2 per cent carbolic solution and dried carefully afterwards.

3. For the disinfection of clothing, blankets, etc., the steam sterilizer is to be recommended the most strongly. (See also H ante). If it can not be carried out, soak the articles in 2 per cent carbolic solution and dry them in the sunlight. Bedsteads and furniture are to be washed with 2 per cent carbolic solution. Polished and carved articles must be well dried.

4. In order to disinfect the bilge, use 1 per cent milk of lime. Prepare as directed in section 1, ante.

5. Corrosive sublimate, although an extremely efficient disinfectant, is very poisonous, and has also the disadvantage of not extending throughout the bilge spaces in uniform strength. Milk of lime is wholly without danger, and by the use of large quantities it may be made to permeate everywhere.

6. If the presence of the cargo makes the bilge difficult of access, and if it is necessary that it should be disinfected, flood it with milk of lime through a pump, noting carefully the level to which it may come without damage to the cargo. After twelve hours it may be pumped out and the lime that has been deposited cleared out by flushing, if necessary and practicable. In wooden ships the proportion of milk of lime to be used is from 40 to 60 liters for each meter of the ship's length. For iron ships it is from 60 to 120 liters for each meter of length, according to the nature of their bilge spaces. If the bilge spaces are divided by partitions, each compartment must be dealt with separately.

7. Cargoes are to be dealt with only when they are contaminated.

8. Cargoes not apt to be injured by steam are to be disinfected by it. Otherwise they are to be disinfected by chemicals. Articles of little value, or those that would be ruined by disinfection, must be burned. Disinfection must be of such a character as not to cause damage to the articles upon which it is employed.

9. Disinfectants now in general use are corrosive sublimate, carbolic acid, and milk of lime. Corrosive sublimate corrodes metals and lacquerware. It can be used for disinfecting woodenware, porcelain, etc. Utensils for eating purposes should not be treated with it on account of its poisonous properties. A very small quantity may prove fatal.

Carbolic acid, in the diluted form in which it is used, is much less dangerous. It is harmless to almost all articles, and if proper care is exercised it is a very safe disinfectant.

Milk of lime is almost entirely without danger. It can be used in a limited number of cases, however, as in houses, on board ship, on the ground, with excreta, etc. It is unfit for use with clothing or other similar articles.

11. Cargo, to be disinfected, must be unpacked. Packages small enough to be put into the baskets of the disinfection chamber often do not require to be untied; but it will be necessary to ascertain that nothing capable of sustaining injury or of causing either fire or explosion is contained therein. Pieces of leather, such as are sometimes attached to clothing, may be disregarded, owing to their small value, and such clothing may be treated with steam disinfection.

12. If a ship is healthy at the time of inspection, inquire if she has had cases of infectious disease or diseases. If such cases terminated more than five days before the date of the inspection, and if no cases have occurred since, such a ship may be declared healthy, and disinfection is not obligatory. But if the cases have been very numerous disinfection is advised.

13. Ships in which there have been fatal cases of infectious diseases are permitted to take on passengers only after disinfection and quarantine for the prescribed number of days.

14. Under extraordinary circumstances ships are allowed to take on passengers without being detained. In such cases they are allowed to leave the station immediately after disinfection, notice being given that carpets must not be laid immediately upon the portions of her decks that have been washed.

15. There are two kinds of quarantine.

(1) *Quarantine for disinfection.*—The passengers land and are disinfected. The ship is thoroughly disinfected. Such ships must be detained for at least five days after disinfection.

(2) *Quarantine for observation.*—When there is fear of the spread of an epidemic, ships are detained and disinfection is carried out, but not so strictly as in the former case. Ships need not be detained necessarily for five days in such cases. It will be seen that the difference is in degree only.

16. If the permission to receive passengers be obtained for ships that have been infected, staterooms in which there occurred cases of infectious disease must remain unoccupied for at least five days after disinfection.

(N) Quarantine Regulations (Army Notification No. 4. Issued by General Kodama for the minister of war, General Yamagata, May 27, 1895):

I. The active departments of the quarantine are divided as follows:

1. Ship inspection.
2. Transportation:
   (*a*) Before disinfection.
   (*b*) After disinfection.
3. Chemical disinfection:
   (*a*) Before transportation.
   (*b*) After transportation.
4. Destruction by fire.
5. Bathing and disinfection:
   (*a*) Inspection.
   (*b*) Baggage room disinfection (for accouterments, etc.).
   (*c*) Waiting room (before bath).
   (*d*) Baths.
   (*e*) Resting room (awaiting disinfection of clothing, etc.).
   (*f*) Dressing rooms, barber shop.
   (*g*) Room where disinfected accouterments are returned.
6. Ship disinfection. Disinfection of station itself after work.
7. Detention for dangerous period.

II. In order to inspect ships:

(1) A ship (coming under the Army Notification No. 6, and No. 18, 1895) returning from the seat of war is to be visited by a quarantine officer on arrival in port, and, according to Army Notification No. 21 (see Form 1, appended, or J, ante), this written account must be given to the quarantine officer. Quarantine officers are authorized to interrogate the captain and others on points relative to the conditions on board ship and to inspect the ship.

(2) If it is found that there have been cases (or deaths) from infectious diseases, or if for any reason disinfection is found to be necessary, the fact will be signaled to the station by the steam whistle of the ship. If patients are found affected with infectious diseases, they will be sent to the appropriate infectious-disease ward of the hospital. Suspicious cases are to be kept under observation in the detention wards under the direction of the medical officer in charge. If clinical histories have been obtained, they had better be sent in with the patients.

(3) The patients (or dead bodies) or articles needing disinfection are intrusted to the transportation officers of the quarantine, and the portions of the ship to be

disinfected are to be reported to the department for disinfecting ships. Articles belonging to patients or to the dead must be entered in a list.

(4) Valuable articles belonging to patients (or to the dead) must be examined and a list thereof must be made in the presence of the captain or of the officers of the ship, who will sign the list. The seal of the captain or those of the officers signing the list must be on this list, and such lists are to be sent to the directors of the quarantine stations. Some articles belonging to army officers and to soldiers are to be treated according to special regulations. Of course such articles must go through disinfecting processes.

(5) After disinfection is finished, the officers of the ship-disinfection department must visit the ship to ascertain that everything is in a satisfactory condition. A certifiate of disinfection will be given to the captain (Form 2, post), and permission will be granted for the vessel to sail for her destination.

(6) Ships under detention for disinfection or for isolation must be visited from time to time, and, if permission is granted for any one of them to sail, the certificate of Form 2 shall be given to the captain.

III. Transportation department officers shall carry out their duties, as follows:

(1) Patients found on board shall be transferred to the quarantine hospital, and dead bodies to the dead-house.

The property of these patients, which must undergo disinfection, must be marked with labels denoting whether this is to be by steam or chemicals. They will be specially marked if they are to be destroyed by fire. Personal effects of healthy individuals, if suspected of being contaminated, are to be treated in the same way. Such articles are to be stored in the baggage room. They will be submitted to steam sterilization, to chemical disinfection, or to destruction, severally, as directed by their labels.

(2) Articles contaminated by the discharges, etc., of patients are to be made thoroughly wet with disinfecting solutions, put into tin vessels, and carried ashore by coolies. Articles too large to be put into cans are to be tied into bundles, after having been made thoroughly wet, care being taken not to spread infectious material.

(3) Relates to the form of checks to owners of property to be disinfected.

(4) Describes the special label, which is of a red color, for property that is to be destroyed. It is to be made out in duplicate, and it contains a list of the articles, their value—if obtainable—the owner's name and regiment, whether it is private or public property, and a statement of the owner's consent to its destruction.

(5) White paper labels are used on articles to be disinfected. They are to be sent to the baggage room to await the director's orders.

(6) Cases developing on vessels in quarantine will be removed at once, along with their effects.

IV. Chemical disinfection is for articles which have been or are presumed to have been contaminated, but which are too valuable to be destroyed and are of such a nature as to be damaged by disinfection by steam.

(1) The details of the process are given in the treatises on disinfection.

(2) Articles that are sent from the temporary baggage room are such as need immediate and special disinfection.

(3) Articles that are stored in storeroom will be transported to the disinfecting room, and at the end of the disinfecting process will be given to the transportation department for storage in the room for disinfected articles.

V. (Repeating directions already considered with regard to the process of disinfecting the clothing of the healthy, etc.—W. F. A.)

VI. (Relating to articles that have been injured by steam disinfection, appraisal, disposition of, etc.—W. F. A.)

VII. (Regarding the use of the ring, checks, etc., at the stations.—W. F. A.)

VIII. (Referring to the special treatises on disinfection, ante.—W. F. A.)

IX. (Giving authority for detention for dangerous period. Bathing and disinfection of clothing prerequisite. The ring to be retained by each person detained, and surrendered only on release from detention. It directs also that repeated visits be made by medical officers to the detention wards, and that notification of the existence of diarrhœa be given by sentries. Disinfection, or even the abandonment of wards is advised upon serious outbreaks, in conjunction with immediate isolation of patients.—W. F. A.)

X. (Having reference to the storage of articles belonging to the patients in infectious-disease hospital in room for disinfected articles; and

XI. Their return to their owners under regulations cited.—W. F. A.)

XII. Patients ill of noninfectious diseases and unable to take a bath are to be provided with disinfected clothing under the most advantageous circumstances possible, in order that their own garments may be disinfected.

XIII. Persons wounded or injured are to be provided with special litters. They must be bathed and their clothing disinfected, if possible.

XIV. On the uses of steam launches and sampans. Sampans that carry infectious cases or materials must be cleaned and disinfected after every such load of infecting persons or materials. They will be distinguished by a yellow flag in the day time and by a red lantern at night with the word "Quarantine." They must keep clear of the sampans that carry disinfected articles and unaffected persons.

Launches will be used for communicating with the ships and for towing sampans. No persons submitted to disinfection will be permitted to get into a launch.

XV. Special regulations cited for the commissariat.

XVI. Immediate notice must be given to the director of a quarantine station upon the discovery of infectious disease anywhere in the station.

XVII. Bugle calls will be used to assemble and to dismiss the soldiers on quarantine duty. Noncommissioned officers will be held responsible for the readiness of their men to undertake the duties allotted to them.

XVIII. Officers will be designated according to their departments in the quarantine work. Soldiers must be designated by special marks of their departments. Those engaged in the parts of the station dealing with disinfected persons and articles always wear white uniforms.

XIX. Disinfectants must be kept in a state of ready accessibility.

Form 1.—This is a declaration, signed by the captain and by the surgeon of the ship, giving the name, kind, and tonnage of the vessel; the date, hour, and port of departure; ports of call; the date and hour of arrival; state of health of ship's company and passengers, with particulars of all illness; number of cases and of deaths on arrival; ports at which landings have been made; vessels communicated with in the course of the voyage; dates of quarantine, detention, or disinfection; whether the cases were of infectious diseases that were received or whether any were suspected of being infectious; classification of persons on board; officers and crew in the order of their rank; where water, fuel, and coal have been taken on board; whether bilges were emptied and flushed out at sea before entering port; animals aboard, number, whence received; what cargo, and where taken in. Remarks regarding measures against infectious diseases, should any have occurred.

Form 2. This is a certificate of disinfection applied at a special quarantine station. It is signed and sealed by the director and by two of the officers of the station.

(O) Regulations for the Army Quarantine Stations:

1. The director (i. e., Dr. Goto) shall plan and carry out the work of the quarantin department and shall direct the several quarantine stations and the operations of their various branches. He is responsible to the chief of the army quarantine department (i. e., General Kodama, vice minister of war, etc.).

2. The director shall superintend the management of each station, and shall endeavor to secure harmonious working of the whole system.

3. The director shall supervise all of the officers connected with the quarantine department, and shall instruct and train them in the methods of the establishment and in plans to be adopted for the prevention of epidemics.

4. The chiefs of each division shall, under the director's supervision, oversee their subordinates, and shall plan and carry out all of the work confided to their departments.

5. Any matter that concerns several departments shall be managed by the department that is the most concerned. This, of course, with the cooperation of the other department or departments.

6. The chief of the quarantine department shall, with the cooperation of his subordinates, carry out the duties allotted to the department, and shall also give full reports and statistics.' He is empowered to form the following three divisions:

Division I. Inspection and disinfection.
Division II. Hospital.
Division III. Reports and statistics.

7. The chief of each quarantine station is authorized to appoint the managers of these three divisions, and he shall regulate the numbers of their staffs according to the amount of work involved.

8. The manager of the disinfecting division shall, under the chief's orders, carry out the work of inspection and disinfection, and he shall also supervise the boiler room and detention wards.

9. The manager of the hospital shall, under the orders of the chief, supervise the quarantine hospital, the detention wards, the dispensary, and shall provide all articles needful for the treatment of the sick.

10. The manager of the statistical division shall, under the direction of the chief, draw up reports of cases and of deaths from infectious diseases and of the

conditions of the epidemic, as well as of ships and their crews and passengers inspected and disinfected at various stations. His reports shall extend to such other topics as may be deemed useful for the management of the quarantine and as shall be deemed likely to serve as a guide for the future.

11. The quarantine department must be provided with daily ledgers, and with copies of telegrams, reports, messages and letters that may be needed for future reference.

12. The chief business manager shall direct his subordinates and carry out all of the duties assigned.

13. Daily ledgers and other office books shall be provided and kept in the business manager's office.

14. All letters addressed to the quarantine station shall be received and opened by the manager.

15. The chief business manager shall examine all of the letters, and those that need further action shall be submitted to the several departments concerned with the subjects of these letters.

16. Communications of importance or those requiring secrecy should be delivered to the director of the station. All letters should be sent to the chiefs of departments, except those that are addressed to the director personally and those that concern only the business manager's office. Other matters of minor importance are left to the discretion of the chief business manager.

17. Personal letters directed to the director shall be given to him by the chief manager in person or by the secretary of the chief (business) manager.

18. Letters received or sent out shall be stamped with the seal of the clerk sending them.

19. The chief of the treasury department controls the monetary affairs and directs his subordinates in the discharge of their duties.

20. The treasurer's office comprises two divisions.

Division I.

1. Salaries, pay accounts, traveling expenses, and miscellaneous expenses.
2. Accounts of expenditures, reports on funds, etc.
3. Embracing account of all receipt of money by the station.

Division II.

1. Purchases of all kinds.
2. Supervision of articles and property generally.

21. Appointments, discharges, and transfers of managing officers and clerks shall be communicated through the chief business manager's office; and, after the receipt of notice stamped with this official's seal, the treasurer shall give or withhold salaries, etc.

22. Articles needed in the several departments are to be applied for upon the application form prescribed.

23. Such forms are to be received by the treasurer, and, according to the regulations, the necessary articles are to be given to the applicants.

24. The purchases are made by means of the application note that is given to the merchant.

25. The merchant is to be paid upon the presentation of this note, which must previously receive the seal of the applicant. The receipted note is kept in Division I, and the original application form is kept in Division II.

26. The members of this department, which is necessarily charged with so much tedious business, are especially urged to cooperate in unison and in harmony.

27. The chief of the architect's department shall carry out the work of and distribute the duties to the subordinates in it.

Division I. Business manager's office.
Division II. Builder's office.
Division III. Mechanical engineer's office.

28. The business (clerks') division shall be charged with all duties relative to all papers, letters and articles; it shall also be intrusted with miscellaneous duties.

29. Builder's office. The superintendent shall superintend all matters relating to buildings and plans, and conduct all of the work of building under the orders of the chief of the department.

30. The mechanical engineer shall attend to matters relating to steam engines, electrical machinery, and mechanical matters of all kinds, under orders from his superior officers, and prevent damage or accidents.

(P) Form of daily report of ships arriving at quarantine stations.
(Q) Form of temperature chart.
(S) Form of report after disinfection of vessels at quarantine stations.
(R) Form of daily report of hospital wards to director of hospital.

(T) Form of hospital case paper.

(U) Form of diet order and prescription with notice to patients.

(V) Form of divisional report.

(W) Form of report of infectious cases made immediately on arrival of transport at a special quarantine department station.

(X) Form of report from detention wards.

(Y) Form of record of ships disinfected at special quarantine stations.

PHOTOGRAPHS.

The descriptions pertaining to each view is written on its back. There is a cycloramic view of the Ninoshima station with the work in progress, and two views of the completed establishment. An unmounted (and damaged) set of four pictures makes up a view of the Hikoshima station with the work in progress, and another unmounted set of two pictures shows a view of the whole station from Shimonoseki Strait. There is a view of the Shimonoseki (civil) station, which is made from the small island where its hospital, etc., is situated.

APPENDIX No. 3.

TECHNIQUE OF EXAMINATION ADOPTED IN INSTITUTE FOR INFECTIOUS DISEASES IN CASES THOUGHT TO BE CHOLERA.

I. Directions about sending specimens.

1. Use a glass-stoppered bottle, washed with boiled water and drained carefully.
2. Omit all disinfectants from bottle and from specimen.
3. Wrap the bottle in oiled paper.

(If pieces of linen, etc., be obtainable that have been wet with the discharges of the patient, send a piece of that alone in a bottle with a small quantity of water, boiled and cooled before use, so as to prevent dessication.)

II. Microscopical examination: Stained preparations, preferably colored with Zeihl's carbol-fuchsin, in the height of the epidemic yielded very trustworthy results almost immediately to experienced observers.

III. Cultures: Peptone solution, bouillon, agar, and gelatin were especially prepared for this purpose. The thermostat was kept at 20° to 21° C. (For special cases where haste was desirable 25 per cent gelatin was used at a temperature of 27° C. The appearance of the colonies are objectionably modified by this procedure.)

(A) At from seven to ten hours after inoculation of peptone solution a drop from the surface is examined. If the result is negative, repeated examinations are necessary at the end of every hour thereafter. If it has been inoculated from a specimen rich in cholera spirilli, the uppermost layers of the solution will be clouded (no pellicle formation), and it will contain cholera spirilli almost in pure culture.

(B) In from twelve to sixteen hours somewhat bluish and quite transparent colonies will appear on agar inoculated from relatively pure specimens. If they are found, replants are made from the pure colonies into peptone solution to test for the cholera-red reaction, and upon agar. Stab and plate cultures with gelatin are also prepared to observe appearance and action of colonies upon this medium. Virulence is occasionally tested by intra-peritoneal injections in guinea pigs.

(C) Gelatin cultures are expected to show characteristic colonies at the end of twenty hours. Positive results are much relied upon with tests involving this medium.

The diagnosis of cholera is considered justifiable in time of its epidemic prevalence if a microscopical examination of original material shows almost exclusively cholera vibrios. This simple test is often quite important, because it makes it possible to do a great deal to prevent the patient's infecting other persons. Skill and practice on the part of the examiners are very important.

If the original specimen has been found to be quite rich in cholera vibrios, the peptone solution inoculated from it will show almost a pure culture of cholera spirilli. When difficulties arise from the small number or absence of cholera spirilli from the original specimen, in which cases solid media yield few results, cultures are to be made in peptone solution from the surface of the peptone solution inoculated from the specimen. If these cultures are negative in results, a third series of cultures are to be made from the top layers of the second cultures. Failure to secure any growth of cholera spirilli from numerous specimens under these circumstances justifies a diagnosis excluding cholera.

At the beginning of epidemics, the examination must be most complete. Both guinea pigs and pigeons should be inoculated, in order to exclude Metschnikoff's vibrio.

In making water examinations, large test tubes (such as are used for collecting serum) are employed. A number of these—the more the better—receive each a sufficient quantity of peptone, sodium chloride, and the suspected water to make solutions of 1 per cent peptone and ½ per cent sodium-chloride strength.

After remaining for twelve hours in a thermostat, the surface layers are to be examined in the same manner as the first cultures in peptone solution.

THE PRACTICAL DISINFECTION OF SHIPS OF WAR.

By THOMAS C. CRAIG, *Surgeon, United States Navy, retired.*

The practical disinfection of ships of war is one of the most important duties that the medical officer may be called on to perform, for on its thoroughness may largely depend the checking of epidemic disease. The number of epidemic and infectious diseases that may be carried in ships is few. Smallpox, cholera, yellow fever, typhus fever, scarlet fever, typhoid fever, diphtheria, erysipelas, measles, tuberculosis, and bubonic plague are among the more important and more common of these. The specific causes of about one-half of the diseases named are now known to be due to certain micro-organisms, and although the specific causes of the remaining ones have not as yet been ascertained, nevertheless it is an undisputed fact that they are highly infectious, and that this infection clings to and is often transported by means of ships. It is to the destruction of these infecting agencies that I desire to call attention. Disinfection may be defined to be the means taken to destroy the living organisms or contagium which would propagate the disease it is the object to eradicate. The power of a germicide is either complete or incomplete. If incomplete, then the result is untrustworthy and dangerous. The practical disinfection of ships naturally divides itself into four heads, viz:

1. The value or efficiency of the means to be employed.
2. Facility of application.
3. Economy.
4. The least possible damage to the infected articles.

A well-known and recognized fact in regard to practical disinfection ashore is that an occupied apartment can not be properly disinfected. This same rule holds good in regard to the practical disinfection of ships. Therefore to thoroughly disinfect a ship it will be necessary to disembark the crew. But before this is done it will be necessary to have each one of the crew free from any contagion. The only way to do this is to disinfect each person just as he leaves the ship, supplying him with clean, uninfected clothing. Any sick are to be transferred to suitable quarters in quarantine, and proper precautions carried out to afterwards disinfect them and their bedding and clothing. In disinfecting a ship it will make a great difference in the manner and extent of the operation to know certain facts, viz, the nature and natural history of the disease; how many of the crew were or are sick; what places in the ship they have occupied; who came in contact with them; where their soiled clothes and bedding were kept, and, if possible, to ascertain where the first case of sickness originated. Then, again, it should be known how the discharges from the sick persons were disposed of. For example, if one single case of an infectious disease had been confined to one certain compartment and the proper precautions taken in visiting him and thorough disinfection carried out in regard to his clothing, bedding, and discharges, and no other case of similar sickness had originated within a reasonable length of time, it would be sufficient to disinfect only that compartment which he occupied.

If, on the other hand, the disease originated aboard ship, from some locally infected area or thing, it would be necessary to find this out and disinfect every person, place, and thing which could have been instrumental in carrying the contagion. The point being this—to disinfect as far as may be necessary.

In searching for a cause of sickness of an infectious nature aboard ship it will be well to remember that most cases are brought about through the medium of food, drink, or air.

It is not the foul-smelling air or bad-tasting food which originate diseases of an infectious nature, but each individual disease is due to a certain specific contagion. As has already been said, the cause of about one-half of the infectious diseases is known to be due to certain micro-organisms; further than this, their manner of infection is known. Hence one is aided in arriving at a knowledge of the means of infection. In the case of cholera and typhoid fever the food or water supply would be the first things to be investigated. On the other hand, in the cases of tuberculosis and erysipelas we could exclude the food and water supply and look for a cause in the local surroundings. Having arrived then at the conclusion that the infection is due to certain factors and surroundings, our efforts should be directed to these things. It will perhaps be more to the purpose of this paper to take up each infectious disease separately or as a class and treat of it in section; but first it will be necessary to give a list of the reliable disinfectants, which time, experience, and experiment have proven to be trustworthy.

DISINFECTANTS.

I shall quote from the report on disinfection made to the American Public Health Association, in 1887, by its committee.

This committee arrived at the following conclusions:

> The most useful agents for the destruction of spore containing infectious material are—
>
> 1. Fire; complete destruction by burning.
> 2. Steam under pressure, 100° C. (230° F.), for ten minutes.
> 3. Boiling in water for one hour.
> 4. Chloride of lime; a 4 per cent solution.
> 5. Mercuric chloride; a solution of 1 to 500.
>
> For the destruction of infectious material which owes its infecting power to the presence of micro-organisms not containing spores, the committee recommends—
>
> 1. Fire; complete destruction by burning.
> 2. Boiling in water half an hour.
> 3. Dry heat, 110° C. (230° F.), for two hours.
> 4. Chloride of lime; 1 to 4 per cent solution.
> 5. Solution of chlorinated soda; 5 to 20 per cent solution.
> 6. Mercuric chloride; a solution of 1 to 1,000 to 1 to 4,000.
> 7. Sulphur dioxide. Exposure for twelve hours to an atmosphere containing at least 4 volumes per cent of this gas, preferably in presence of moisture.
> 8. Carbolic acid, 2 to 5 per cent solution.
> 9. Sulphate of copper, 2 to 5 per cent solution.
> 10. Chloride of zinc, 4 to 10 per cent solution.
>
> The agents named in this list are all comparatively cheap, and leave scarcely anything to be desired from a practical point of view.

I might add that two of the cheapest and most efficient germicidal disinfectants are crude carbolic acid and creolin. They can be used either of full strength or in a diluted form.

THERMAL DEATH POINT.

All known microorganisms are killed when the temperature surrounding them is raised to a certain degree in the presence of moisture, and it has also been proven that infected clothing and apartments, rendered so by diseases, the causes of which are not yet known, may be made noninfectious by subjecting them to a certain degree of heat for a certain length of time. This, then, has come to be known as the thermal death point of bacteria. In the infectious diseases, the causes of which are known, it ranges from 52° C. in the case of the cholera spirillum to 100° C. in the case of the tubercle bacillus. Exposure to cold or freezing is not reliable for the destruction of some of the infecting bacteria. In 1887 Prof. T. M. Prudden, of New York City, demonstrated that the bacillus of typhoid fever survived a freezing temperature after one hundred and three days.

To these means may be added sunlight, cleanliness, and desiccation. These aids will be more fully discussed under the head of disinfection in cases of cholera. A very cleanly, cheap, and practical means of disinfecting the walls of rooms, or in fact any smooth surface that would be injured by the application of heat, moisture, or chemicals, is one used by the Brooklyn Board of Health, viz, by means of bread. A loaf of bread is cut into several pieces, and the soft, spongy surface is used to rub down the walls, ceilings, pictures, etc. This rubbing crumbles away the bread, and the bacteria are thus entangled in these crumbs, which fall to the floor, where they are afterwards swept up and burned. Of course this mechanical mode of disinfection would be supplemented by the use of chemical disinfectants applied to the woodwork, chandeliers, floors, etc., the carpets, bedding, curtains, etc., being subjected to the action of dry heat. Lately the gas formaldehyde has been brought forward as an efficient germicide. Several means of applying this agent have been devised, as for example, spraying by an atomizer the 40 per cent aqueous solution, or by burning methyl alcohol in a specially constructed lamp, or by evaporating the aqueous solution of this gas.

The volume per cent per cubic space of this gas required to act as a germicide has not yet been accurately determined. In the annals of the Pastuer Institute for September, 1896, Vaillard and Lemoine give the results of their experience as follows: The test organisms were exposed to the action of the gas in different-sized rooms, and were placed at different heights, and different distances from the source of this gas. The bacteria and other test materials employed were, in part, as follows; dried diphtheritic membrane, alvine dejections, blood from an animal infected with the pneumonococcus, staphylococcus pyogenes aureus, cholera spirillum, streptococcus, typhoid baccillus, sporulating anthrax, tetanus bacillus, etc. Nearly all the test organisms and materials were freely exposed to the action of the gas, except the few which were covered over with a fold of cloth. Several series of experiments were conducted, and inoculations of the tested organisms and materials were made into culture media. Dust from various parts of the room was also inoculated into culture media. The different experiments were conducted for various lengths of time, varying from six hours to twenty-four hours. The volume per cent per cubic contents of the gas is not given, but is stated to have been in abundance. The conclusions reached by these experimenters were: That the gas of formaldehyde is efficient as a germicide for bacteria other than the sporulating ones; that it makes no difference from what source or in what way the gas is supplied, provided there is a sufficient amount of moisture present, and the gas is in abundance, and an exposure of twenty-four hours is allowed; that it does not penetrate materials, except possibly those of an albuminose nature, but merely acts on the surfaces; that the gas should be disengaged rapidly and in large quantities. To give some idea of the volume of this gas present in the most successful of these experiments, and the one in which all of the nonsporulating organisms were killed after an exposure of twenty-four hours, I might mention that the volume of gas contained in a 35 per cent solution of 15 liters was used in a room of 660 cubic meters (practically a room about 13 feet square).

A series of experiments were made some few years ago by the New York board of health in order to determine the actual value of certain disinfectants, and I have made use of their report (1892) in order to show the relative value of some of these disinfectants. Of course no one will deny that fire and live steam are the most potent of all the disinfecting agents, but it is often impossible to use them; hence it becomes necessary to resort to other means. The ones the New York board of health tried were the following: Electrolyzed sea water, sulphurous acid gas, and heat, both dry and moist. Electrolyzed sea water is a patented germicide, made from sea water. It is readily prepared by passing an electrical current of a certain intensity through sea water. The current strength is 10 amperes, and electromotor force 4 volts. This current is passed through the water for some hours, and by its action sets free the chlorine, which in turn is taken up by the water.

The cost of its production is very small, amounting only to a couple of cents a barrel. The conclusions reached by the experimenters were that it is a fairly good germicide when freshly prepared and when a certain amount of chlorine gas is present; that it is particularly useful for the destruction of the cholera spirillum; but that it is not a good germicide for spores or for the more resisting micro-organisms.

Sulphurous-acid gas is a reliable disinfectant when in sufficient quantity and the atmosphere of the apartment is saturated with the vapor of water. The general rule given for the percentage of this gas is as follows: First the cubic air space of the place to be disinfected is obtained. Then the amount of sulphur to be burned is calculated, allowing 5 pounds of sulphur for each 1,000 cubic feet of space to produce 4 per cent of gas. All outlets should be closed, such as air ports, doors, hatches, and made as nearly air-tight as possible before the gas is generated. I think that the error has too frequently been made of not having sufficient watery vapor present to insure the prompt action of the gas. A small amount will not answer. The quantity should be such that the air is fully saturated, the condensed vapor being very easily seen to form on the furniture, walls, etc. Of course, when these conditions are carried out the textile fabrics, such as rugs, curtains, clothing, etc., will have the color bleached out of them; but in disinfection, under certain conditions, this destructive action will not be of such great moment. It is efficiency and ease and thoroughness of application which are sought. Applied in the above manner, sulphurous-acid gas is safe, reliable, and quickly efficient for such diseases as smallpox, measles, and scarlet fever.

Now as to the way of generating this gas. The ordinary mode of procedure is the following: Having broken up the sulphur into small pieces and weighed out the necessary quantity to produce the requisite amount of gas, place it in a good-sized iron vessel having high sides and saturate it with alcohol; then place this vessel on several bricks in a larger vessel, generally a wooden tub, in which there is sufficient water to cover the bottom to the depth of 4 or 5 inches. The arrangement is now ready for use; but before doing this it is essential to provide for the watery vapor before spoken of. A small hose led from a boiler or steam radiator or any vessel containing water and in contact with a fire will supply the steam vapor. When all these arrangements are ready and the cracks and crevices and all means of exit are closed tightly, the steam should be turned on, and as soon as the apartment is well filled with the steam vapor the alcohol on the sulphur should be lighted, and the gas will then be disengaged. The place should be kept tightly closed for twenty-four hours, when it may be opened, washed down, well aired, and dried, and is then ready for occupancy. Liquefied sulphurous-acid gas in cylinders may also be used; but for all practical purposes the above outline can be followed, provided enough sulphur is burned to produce the requisite per cent per volume of gas.

Now in regard to the efficiency of sulphurous-acid gas as a germicide. Through the kindness of Dr. Alfred L. Beebe, of the New York board of health, I am permitted to make use of a series of experiments conducted by him to determine the germicidal value of sulphurous-acid gas under a variety of conditions.

These experiments have never been published; hence the more interest and value attached to them. The experiments were in 20 series and amounted in all to 582 observations. The receivers were rooms of known capacity; the test organisms were the bacillus diphtheria and the staphylococcus pyogenes aureus. The rooms were capable of being made air-tight or otherwise, so that in some of the experiments they were sealed, while in others they were not. Various amounts of sulphur were burned and various quantities of aqueous vapor were allowed to be present. The time of exposure of the test organisms was varied, as was also the distance from the burning sulphur and the distance from the floor. The test organisms were exposed in different ways, such as on pieces of sterilized linen, on dried sterilized pieces of carpet, on the clean walls by smears, etc. "The principal varying factors were the condition of the receiver, the amount of sulphur burned, the duration of exposure of the cultures to the gas, the amount of moisture present, and the method of exposure in the room." "No positive effect on both test organisms was noted with a less amount than 1 pound per 1,000 cubic feet, and the cultures were not killed with less than 2 pounds. With 2¾ pounds and with 3 pounds as good results were obtained in some cases as with 4 or 5 pounds."

The time of exposure varied from one to twenty-six hours. The amount of watery vapor present ranged from the usual amount of moisture present in the atmosphere of a dwelling room to the complete saturation of the air to the dew-point. This moisture was supplied by evaporating water by means of heat. The walls and ceilings in one of these rooms were covered with ordinary plaster, while in the other this plaster was painted over, so as to give a smooth surface. "All experiments were made in duplicate, so far as the test organisms were concerned, and control tests were made with every series." Cultures of the tested organisms were kept under observation for times varying from twenty-four hours to two and a half weeks. From these extended series of experiments and observations the following conclusions were arrived at:

> The germicidal value of sulphurous-acid gas, as indicated by its effect on the micro-organisms employed for test, depends on several factors, all of which must be taken into consideration. Absolute certainty of germicidal action was not obtained

under the conditions of experiment, even when these were probably equivalent to the best to be had in routine fumigation of infected premises. It may, however, be safely asserted that the probability of efficient action approaches a point very near certainty under the following general conditions, viz: A room in a well-built house, with painted walls and ceilings, made tight by pasting paper over all cracks and openings; sufficient sulphur, moisture, and time of exposure; and, finally, free exposure of the germs to be destroyed. Mention should also be made of the tendency manifested by the test organisms to lose their vitality through age, becoming thus easily and quickly affected or even killed by the gas. Various experiments were rendered inconclusive because the test organisms exposed were old. The probability that all germs in a room have been killed by sulphurous-acid gas is increased, therefore, if it is known that these are old. The importance of this lies in the recognition of the greater difficulty of killing the germs in a room very recently occupied by a case of diphtheria. From what has been said it follows that the principal factors to be considered are the following five:

1. The amount of sulphur burned per cubic foot of air space.
2. The duration of exposure of the test organisms to the gas.
3. The tightness of the room.
4. The percentage of moisture present.
5. The freedom with which the gas can come in contact with the test organisms.

1. While under favorable circumstances the amount of gas obtained by burning two pounds of sulphur per 1,000 cubic feet of air space may prove sufficient as a germicide, that obtained from three pounds gives much more uniformly good results in killing the test organisms; but it is to be noted that even five pounds will not prove efficient unless the test organisms are exposed for a considerable time and other conditions are favorable.

2. When the sulphurous-acid gas is present in sufficient amount for germicidal action and other conditions are favorable, its efficiency is probably directly proportionate to the time it has to act. In rooms with unpainted walls and ceilings, however, gas sufficient for germicidal action will probably stay in the room not more than eight hours, and under the best conditions an exposure of less than three hours can not at all be relied upon.

3. Unless sulphurous-acid gas can be confined so that it is in contact with the test organisms in sufficient amount for a considerable time, it is inefficient. The ordinary room can not be made a good receiver for the gas without painting or otherwise making walls and ceilings impervious to it; but in a room in a well-built house, with painted walls and ceilings and made as air-tight as practicable by pasting paper over all the cracks and apertures, the gas, if considerable in amount, will be delayed in its passage out long enough to give time for germicidal effect. In a room in which the gas is not so held no reliance can be placed on its germicidal action.

4. While under otherwise favoring circumstances the percentage of moisture usually present in air not artificially dried may be sufficient to allow the destruction of the test organisms, an increased supply of moisture does aid materially in such destruction and is usually a necessary factor for decided germicidal action. It is to be noted that an important amount of moisture may be added to the air of a room by means of the water evaporated from an outer dish by the heat of sulphur burned in an inner dish.

5. The more freely germs are exposed to sulphurous acid gas the more rapid and certain will be the germicidal action. It is probable that no reliance can be placed on the destruction of germs not on the surface or protected in any way from ready access to the gas. It may be added that in a room of ordinary size it is probable that the place of the germs in the room and their distance from the burning sulphur is unimportant.

RECOMMENDATIONS.

Upon the assumption that the apartment to be disinfected is of a character to admit of its being made practically air tight, the following recommendations are offered as to the method of using as a germicide sulphurous acid gas produced by burning sulphur.

1. Remove from the room for disinfection by steam, boiling water, or disinfecting solutions, all articles of clothing and bedding, carpets, etc., which will admit of such treatment. Open all closet doors, drawers in bureaus, etc.
2. Sprinkle water on the floor, the woodwork, and such of the contents of the room as would not be thereby injured.
3. Close tightly the doors, windows, and all other openings, and then paste strips of paper over all cracks.
4. Burn at least 3 pounds of sulphur for every thousand cubic feet of air space

in the room. Put not over 5 pounds of sulphur in any one vessel, and immerse these to a depth of at least 1 inch in water (preferably heated) contained in outer vessels.

5. After lighting the sulphur, close exit door tightly and seal it on the outside by pasting strips of paper over all cracks. Keep the room closed for at least eight hours.

Upon the supposition that the above recommendations have been carefully followed, if when the room is opened the sulphurous acid gas is found to be so abundant as to make it impossible to enter the room at once, efficient disinfection of exposed surfaces may be regarded as almost a certainty. If on the contrary the sulphurous acid gas is found to have largely escaped, reliance can not be placed on its germicidal action.

CARBOLIC ACID AND CREOLIN.

Carbolic acid is one of the most reliable and powerful germicides known. Various experiments have been conducted to determine its value as a disinfectant. As a rule a 1 per cent solution is efficient for nearly all organisms, but in practice a 5 per cent solution is used. With this stronger solution (1 to 20) all of the nonspore-bearing infecting bacteria are certainly destroyed after an exposure in it of two hours.

Crude carbolic acid and creolin are also safe and sure in their germicidal action. They may be used of full strength or diluted. Creolin is particularly efficient as a germicide even in dilution as low as 2 per cent (1 to 50), but on account of its cheapness we are enabled to use it in much stronger solution.

A safe rule would be to use it in the strength of 1 to 20, which makes a 5 per cent solution. On account of its small cost and of its harmless action on metals, it is par excellence the germicidal agent to use in the disinfection of bilges and under-water compartments which are only accessible to disinfection by flooding. Several barrels of this creolin could be pumped into a compartment, and after remaining there a few hours could be pumped into other compartments, and then into the bilge before being pumped overboard, and thus utilized in continuous disinfection.

MERCURIC CHLORIDE.

In mercuric chloride we have one of the most powerful germicides that has yet been discovered. Various experimental data have shown that this salt is efficient for the destruction of the most resistant spore-bearing bacteria, in the proportion of 1 to 1,000, in a few minutes, and for the destruction of the nonspore-bearing bacteria, 1 to 10,000, for two hours. The great drawback to the use of this salt in general is the fact of its ability to coagulate albumin, and thus envelop bacteria in an impermeable covering. In practical disinfection it has come to be the general rule to use this salt in solution in the proportion of 1 to 500 or 1 to 1,000. Used in these strengths it is capable of destroying all known bacteria, including the spore-bearing ones. There is one essential to bear in mind in using this agent, and that is its chemical action on metals. For this reason it is inadmissible for use in the bilges and places where the metal is exposed to its action.

For apartments and places in which the metal work is well covered with paint, for woodwork, curtains, bedding, clothing, carpets, furniture, rugs, etc., it is a safe, reliable, and efficient germicide.

CHLORIDE OF LIME.

The value of chloride of lime as a disinfectant depends on the available chlorine held in combination as hypochlorite. When this amount is 25 per cent, then is this salt reliable and efficient as a germicidal agent. It has been found that a solution of chloride of lime in the proportion of 0.25 of 1 per cent is an effective germicide. A safe rule would be to use a 5 per cent solution of this salt for purposes of general germicidal action. One ounce of chloride of lime of the standard strength mixed with 20 ounces of water makes an efficient disinfectant to use for the destruction of all bacteria in typhoid fever and cholera dejectæ.

FRESHLY SLAKED LIME.

Freshly slaked lime, used as an adjuvant for the purification of an infected bilge, is useful; but in order to be efficient it must be recently slaked and used in the form of milk of lime. This milk of lime can be deposited in a ship's bilge and allowed to remain there several hours. The bilge can be flushed with clean water and pumped out. Metal exposed to contact with lime is not injured. One great advantage of freshly slaked lime, used to disinfect a bilge, is its power to saponify the oils generally found mixed with the bilge water and adhering to the surfaces and sides of the bilge. This cleaning away of the oleaginous materials from these surfaces renders subsequent procedures more certain of success. A strong solution of caustic soda or caustic potash would, of course, answer the same purpose.

THE DOUBLE-BOTTOM COMPARTMENTS AND THE BILGES.

In disinfecting the double-bottom compartments and the bilges, due regard must be had to using those agents which will not have a deleterious chemical action on the metal. For this reason, substances such as mercuric chloride, chlorinated lime, electrolyzed sea water, etc., can not be used. Recourse must then be had to using such things as do not act destructively on the metal. These would be steam, hot water, caustic alkalies, lime, crude carbolic acid, creolin, sulphurous-acid gas, etc.

The compartments in the double bottom and the bilges should be disinfected in the following way: The manhole leading into each compartment should have fitted into it a wooden cover which is capable of being securely fastened down and made air-tight. In the center of this wooden cover should be a hole into which the nozzle of a hose can be tightly fitted. This having been done, live steam is then turned on and allowed to flow in until a thermometer—previously inserted through this same wooden cover—shows the temperature to be maintained at 100° C. for ten minutes. The cover is then taken off and the condensed water is pumped out. Each compartment is thus treated. Where it is impracticable to use steam, sulphurous-acid gas may be substituted, burning the same amount of sulphur per 1,000 cubic feet capacity, and furnishing the requisite moisture, as indicated under the remarks concerning sulphurous-acid gas. In addition to these means the compartments can be washed down with crude carbolic-acid solution (1 to 20) or creolin solution (1 to 20), and finally milk of lime can be placed in the lowest part of these compartments, where drainage collects by gravitation.

THE BILGES.

The drainage system of the inner bottom is called the bilge. Drains pass from the sides to the center, and it is this central longitudinal drain which carries the liquids to a central well, where the material is finally pumped overboard.

The only possible way to disinfect a bilge would be first to disinfect the material in the bilge well before it is pumped overboard. Then the different drains leading into the central one can be flushed out with the germicidal agents, and these, after finding their way along the drains to the well, can then be pumped overboard. Hardened, inspissated grease, adhering to the sides and bottoms of these drains, is one of the most troublesome materials to get rid of. The decomposition of this substance gives rise to foul odors, which often penetrate the whole of the inner drainage system, and from thence to the upper decks of a ship. It has occurred to me that to flush these drains with a strong solution of caustic potash or soda, or the milk of lime, would saponify this greasy material, while at the same time they would act as disinfectants. After they remain in contact with these drains and in the well, they are pumped overboard. Then to make the disinfection yet more complete, crude carbolic acid or creolin in the proportion of 1 to 20 or 1 to 40 may be used to again flush out these drains and the well, and then pumped overboard. If it is decided that the disinfection is yet incomplete, then the engine room and all openings leading into it can be made air-tight, and live steam turned in and kept flowing until the temperature in all parts is raised to 100° C., and maintained thus for one hour.

In practice I believe that it will be very rare to carry any disinfection to the extent of applying it to the compartments of the double bottom.

DISINFECTION APPLIED TO SPECIAL DISEASES.

CHOLERA.

In regard to the disinfection of a ship infected with cholera, it will be necessary to proceed in three ways:

First, to remove the sick to some quarantine.

Second, to disinfect all the remaining persons and their effects and then remove them from the ship.

Third, to disinfect the ship.

The sick should be removed under a strict quarantine, and continued under such until the final termination of the case. The means for disinfecting their persons, clothing, discharges, and the disinfection of the remaining persons on board ship and their belongings prior to removal from the vessel, will be dealt with under one general head, viz, hygiene and disinfection of cholera-infected persons and effects.

There are certain natural agents which are deadly to the growth of the cholera spirillum, and supplemental to these are the empirical means used to destroy this organism. These two means combined are the most potent agencies with which to combat the cause of cholera. The natural agents are sunlight and desiccation; the empirical agents are heat, chemicals, and cleanliness. The action of sunlight is in itself quite potent in destroying the cholera germ. It is not the direct heat contained in the rays of the sunlight, but there seems to be some inherent chemical action in the rays of sunlight by which the growth of the cholera spirillum is inhibited, and if long enough continued to destroy the life of this bacterium.

It might be asked, then, why is it that the intense sunlight which we generally find in tropical countries does not completely destroy all the spirilla of this disease. In answer to this it may be suggested that the spirilla are not all subjected to the action of sunlight; that sunlight does not penetrate very far into water, and that shade is abundant in the tropics. Recent experiments by a German investigator have shown that the influence of sunlight on bacteria extends in muddy water to about 20 inches below the surface. Water is the sole vehicle of contagion in cholera. With poor sewerage and drainage it is easy to imagine the contamination of the drinking supply. The other natural agent, which is deadly to the growth of the cholera, is desiccation. This agent is more potent for the destruction of the cholera spirillum than the first one mentioned, viz, sunlight. The cholera germ can not live without moisture. In this particular it differs widely from most others of the pathogenic bacteria. It is well known that the vitality of many of the pathogenic organisms remains almost indefinitely in the dried condition. In witness of this I would instance anthrax, tubercle, diphtheria, and the tetanus bacillus.

Not so with the cholera spirillum. Desiccation means death to it. It requires moisture in order to live. A drying for twenty-four or forty-eight hours destroys it. When these two natural agencies are combined, we get a very high and potent factor for the destruction of the cholera spirillum. Now as to the empirical means. The chief of these is heat. The thermal death point of the cholera spirillum is 52° C., hence how easy it is to destroy this spirillum by simply boiling our drinking water, and by subjecting to a sufficient temperature all infected articles. The next means that empiricism has taught us to use are acids and other chemicals. Long before the cause of cholera was known it was found that acid lemonade was useful during cholera epidemics to guard against the disease. All acids exert an inhibitory action on the growth of the cholera spirillum, and if sufficiently concentrated will destroy its vitality; hence how easy it is to destroy this organism by means of acid solutions. They are almost prophylactic against this germ. Chemicals, such as carbolic acid, mercuric chloride, calx chlorinata, liquor sodæ chloratæ, milk of lime, etc., also destroy the cholera spirillum, and thus become useful agents as disinfectants against this germ.

Employing sunlight, desiccation, acids, chemicals, and heat will serve as the means to use in case of disinfection for infection by the cholera germ. All contaminated clothes, bedclothes, syringes, basins, etc., and in fact all articles which have been soiled by the discharges from cholera patients, should be subjected to the action of a strong solution of carbolic acid (1 to 20), for six or eight hours; or should be exposed to dry heat at 100° C. for an hour. If this is not possible, then the articles should be boiled in water for an hour or two; in either case making sure that the heat penetrates to all parts alike. Under other circumstances soaking in a 1 to 500 solution of mercuric chloride would answer just as well. Soiled bedding should be burned in a furnace; while soiled furniture, soiled decks, soiled bunks and hammocks, should be washed with a 1 to 500 solution of mercuric chloride and afterwards exposed to the direct rays of the sun and to the heat. The patient himself should be well bathed in a strong solution of acetic or citric acids, and afterwards put on clean clothing, and be removed to a clean apartment. The disinfection of the discharges of cholera patients is probably the most important matter in this connection. Before they are finally disposed of, they should be subjected to the action of a strong solution of carbolic acid or mercuric chloride (these quantities should be twice the volume of the fæces) and should be thoroughly mixed and allowed to stand for an hour or two before being thrown away.

TYPHOID FEVER.

Drinking water and milk are almost the sole means by which typhoid fever is communicated from one person to another.

It is now definitely known that this disease is due to the bacillus typhosus, and that it only infects when introduced into the alimentary canal; hence it can only be conveyed by this organism gaining access to either the food or drink supply. As the great bulk of our food is prepared by subjecting it to the action of heat, and as the thermal death point of the bacillus typhosus is 56° C., which is far below the temperature used in the cooking of food, it is certain that this organism is never introduced into the alimentary canal, in a living state, by recently cooked food. It is for this same reason that the vitality of this organism can not resist the temperature of boiling water; hence, with recently cooked food, and recently boiled drinking water, the entrance of the living germ of this disease, into the alimentary canal, is impossible. Heat then, either dry or moist, is the most ready means to use in order to destroy any infection from typhoid fever. In addition to this, chemicals and the routine disinfection may be used.

A (1 to 20) carbolic acid solution or a (1 to 500) mercuric chloride solution may be used to immerse all the contaminated clothing and bedclothing. All furniture and utensils used about the sick can be washed with these solutions, and then in fresh water. A ready and effective means would be to boil in water all contaminated garments and bed linen, and to wash the walls and ceilings with the carbolic acid or mercuric chloride solution.

Attention should be had to the drinking-water supply. All the water tanks should be emptied, after having first destroyed all the bacteria in them. This now brings up the question as to how this can be readily and effectively done. There is no better way than the following: A hose is led from the boiler, and its nozzle being immersed in the water, the steam should be allowed to flow in until the water is all heated beyond the thermal death point of this organism. These tanks should then be thoroughly cleaned by means of scouring and scrubbing them out with milk of lime, then with fresh water, and finally allowing them to dry completely. As the means for the destruction of both the cholera spirillum and the typhoid bacillus are almost identical, the same disinfection agents that would apply to one will in like manner apply to the other.

All dejectæ and vomited matters are to be disinfected by subjecting them to an equal quantity of the carbolic acid or mercuric chloride solutions, or to milk of lime or chlorinated lime.

Having purified the drinking-water supply, and disinfected all the bedding, clothes, furniture, rugs, curtains, and apartments, attention is then directed to the purification or disinfection of the compartments in the double bottom and the bilges.

DIPHTHERIA, TUBERCULOSIS, AND ERYSIPELAS.

The specific cause of diphtheria is the bacillus diphtheria; that of tuberculosis is the bacillus tuberculosis, and that of erysipelas is the streptococcus pyogenes.

The means used to destroy these organisms are identical. It is well to remember that the diphtheria germ and the tubercle bacillus are always contained in the materials which are expectorated.

These things may be deposited on clothing, bed linen, handkerchiefs, eating and drinking utensils, or they may be accidentally deposited on carpets, rugs, etc., and then drying, they are, in the form of dust, deposited on the walls, ceilings, furniture, curtains, etc.

The germ of erysipelas in like manner may be accidentally deposited in the form of dust on the ceilings, walls, furniture, curtains, etc. It is, then, the disinfection of these things and places to which we must give our efforts. All curtains, clothing, bedclothing, carpets, rugs, etc., should be immersed in a 1 to 20 solution of carbolic acid, or a 1 to 500 solution of mercuric chloride and remain there for twelve hours; or when this is not possible they may be subjected to the action of dry heat at 150° C. or moist heat at 100° C. for an hour. After these things have been removed from the rooms, compartments, and decks, where cases of sickness of this nature have been, it then becomes necessary to disinfect the floors, walls, ceilings, beds, furniture, and utensils which these sick persons used. The means found to be most effective are to wash all these places, things, and utensils thoroughly, first with the carbolic acid or the mercuric chloride solutions, and then, after twenty-four hours, with fresh water, and allow them to dry. It will not be necessary to disinfect the bilges or any part of the ship in which these cases of sickness did not go.

TYPHUS FEVER, MEASLES, SMALLPOX, SCARLET FEVER, YELLOW FEVER.

We now come to a group of infectious diseases, the cause of not one of which is known, but from experience in disinfection after them we know that the contagium can be destroyed by certain means. In what manner these diseases are conveyed from one individual to another is not definitely known, but it is a well-known fact that, with possibly one exception, viz, yellow fever, they can all be conveyed by means of any infected material or thing which has been in contact with them. It is, moreover, very certain that the contagium gains entrance to the system through the medium of the respired air. Desiccation is not fatal to the contagium of these diseases. Infected clothing and apartments retain the contagium for a very long time, and it is often through the medium of these things that these diseases are conveyed from person to person.

The food and drinking water can be excluded as possible sources of infection in all of these diseases, with the possible exception of yellow fever. As these diseases are very infectious, it is quite important that ships infected with them should be thoroughly disinfected, and to do this it will be necessary to use those means only which are known to be effective. The means that have been found to be reliable are fire, dry and moist heat, carbolic acid solution, mercuric chloride solution, and sulphurous acid gas. Infected clothing and utensils should be immersed in the carbolic acid solution or the mercuric chloride solution. All carpets, rugs, curtains, and mattresses should be subjected to the action of dry heat at 150° C. for two hours or moist heat at 100° C. for one hour. Should this be impossible, they should then be immersed in either the carbolic acid or mercuric chloride solutions. All furniture, walls, floors, and ceilings should be washed down with either the carbolic acid or mercuric chloride solutions first, and, after twenty-four hours, with fresh water. All compartments should then be made as air-tight as possible by closing air ports, skylights, etc., and then thoroughly wetted down with water, or the air thoroughly saturated with moisture, and, after this, the requisite amount of sulphur burned in them, according to the directions given under the head of sulphurous acid gas. After this gas has been allowed to remain in contact with these places for twenty-four hours, they may be opened, again washed down with fresh water, and allowed to dry and air thoroughly. It will be unnecessary, except in the case of yellow fever, to disinfect the compartments in the double bottoms and the bilges. In the case of yellow fever, the purification of these places and of the drinking-water supply should be carried out according to the directions given under the head of cholera and typhoid fever. While it may be possible for coal from an infected locality to be the means of carrying the contagium of yellow fever on board ship, yet the chances are slight. Should the opinion be arrived at that the coal might possibly be infected, then it would be necessary to disinfect the coal in the bunkers. To do this thoroughly is a very difficult matter, and the only way that it can be done successfully is the following:

Begin with the most accessible bunker by first spraying all the surface of the coal that can be reached with a solution of crude carbolic acid or creolin (1 to 20); then, while this is still wet, subject it to the action of sulphurous acid gas in as large amount as can be generated by burning sulphur and closing up the bunkers for twenty-four hours; but, of course, in doing this due regard must be given to guard against igniting the coal.

At the end of this time the coal can be removed. Each bunker should be treated successively in the same way until they are all finished. After the coal is all removed the bunkers should be well washed down with the carbolic acid solution and then allowed to thoroughly dry and air. Where it is impossible or impracticable to use the sulphurous acid gas, then after the spraying with the carbolic acid or creolin solutions live steam may be introduced into the bunker until the temperature is ascertained to be 100° C., and this should be maintained for an hour.

BUBONIC PLAGUE

The infectious nature of this disease is now definitely established, and the cause of it has been found to be due to a certain micro-organism, which has been named the bacillus pestis bubonicæ. It is one of the most fatal infectious diseases known, and ships infected with this disease will require the most thorough disinfection. It has not yet been definitively ascertained whether or not this disease is introduced into the human system by means of the respiratory or the digestive tracts; but it is certainly known that it can be introduced by a wound in the skin, as happened in the case of the Japanese investigator, who, while holding an autopsy on a case dead of the plague, accidently cut his finger and in due course of time the disease manifested itself, but was not fatal in his case. In a series of experiments made in January of this year I found that the thermal death point of the plague bacillus was 60° C., and that when a bouillon culture of this bacillus was dried on sterile strips of woolen blanket it resisted desiccation for more than ninety days. The means to be used to disinfect a ship infected with this disease should be as follows: All infected clothing, bed clothing, mattresses, carpets, rugs, curtains, etc., should be immersed in the carbolic acid solution (1 to 20) or the mercuric chloride solution (1 to 500) for six or eight hours, then subjected to a prolonged boiling in water for several hours. If this is not possible, then these things should be exposed to the action of steam at 100° C. for an hour or two in an air-tight compartment.

The place occupied by the sick person should be made air-tight, wetted with water, and the requisite amount of moisture introduced, and the proper quantity of sulphur burned, allowing the sulphurous acid gas to remain in contact for twenty-four hours. The compartment should then be opened and the floor, ceiling, walls, bunks, and furniture thoroughly washed with mercuric chloride solution (1 to 500), and after this has remained in contact for five or six hours then washed with fresh water, dried, and allowed to thoroughly air. Each compartment, room, cabin, or storeroom in which any case of this disease was, should be treated in the same manner. The drinking water in the tanks should then be purified and pumped overboard, as was described under the head of cholera, the tanks being subsequently cleansed as was also noted under that head. Where the bedding and clothing are not of sufficient value to save, they should be burned in the furnace. The utensils used in treating these cases should also be subjected to the same disinfection as the compartments.

It should be the aim in disinfection of all infected ships to thoroughly and effectively destroy all means of contagion, relying for this on the faithful and the conscientious carrying out of the directions given under the head of each disease or class. The thermal death point of these infecting organisms should be borne in mind, and also the chemicals which are fatal to them. The ingenuity of the disinfector will often be taxed to its utmost to devise ways and means by which the disinfecting agents can be best and most efficiently applied. It will be to his intelligent and ready understanding of these things on which will often depend the thoroughness of his work. A careless or insufficient attempt at disinfection is more dangerous than none at all, for it only leads to a false security.

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REPORT

OF THE

SURGEON-GENERAL, U. S. NAVY,

CHIEF OF THE BUREAU OF MEDICINE AND SURGERY,

TO THE

SECRETARY OF THE NAVY.

1898.

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SURGEON-GENERAL, U. S. NAVY.

NAVY DEPARTMENT,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., October 1, 1898.

SIR: In obedience to instructions contained in Department's letter of July 9, 1898, I have the honor to report the operations of this Bureau for the past year, accompanied by a set of annual estimates for the fiscal year ending June 30, 1900, and a statistical report showing the health of the Navy for the year 1897. The report embraces a statement of the condition of the naval hospital fund, the naval medical establishment, and other matters of interest pertaining to the duties of the Bureau of Medicine and Surgery.

The term of Surgeon-General Tryon expired on September 10, 1897. His good judgment and foresight in putting in order and equipping the several naval hospitals was of incalculable service to the Bureau, in enabling it to properly care for the sick or wounded of the Navy during the war.

Surg. J. C. Boyd, assistant to the Bureau, was acting chief of the Bureau from September 10 to October 1, 1897, and performed the duties of the office creditably and efficiently.

Medical Director Newton L. Bates was appointed Surgeon-General on October 1, 1897. He died on October 18, 1897, before he had an opportunity to take charge of the office he was so well qualified to fill.

The appointment of the present Surgeon-General dates from October 22, 1897.

In this report precedence is naturally given to the operations of the Bureau during the war with Spain. From the time of the blowing up of the *Maine* in the harbor of Havana on February 15, 1898, preparations were made by the Bureau providing for any possible contingency. The naval hospitals were equipped to their full capacity; plans were prepared for building pavilion wards on the hospital grounds to give accommodation to any number of sick or wounded that the Bureau might be called upon to care for. The director of the naval laboratory prepared to furnish medical and surgical supplies in any quantity, at any place, and immediately. No additional expense was incurred until war seemed imminent; then the vessels that were likely to be engaged were supplied with a full outfit of supplies for war. In anticipation of a large number of additional vessels being taken for service, medical and surgical outfits of a kind suitable for the various classes of vessels were bought, assembled, and boxed, ready to be shipped anywhere as soon as called for. There has not been an instance during the war of any vessel having had to wait for her medical stores.

It was known that a corps of volunteer medical officers would be a necessity, and before war was declared or any law passed authorizing their employment medical boards of examination were established in Boston, New York, Philadelphia, Washington, Norfolk, and Mare Island (Cal.), to examine applicants for appointment, such appointment being contingent upon their services being required. As the result of their examinations a waiting list of well-educated medical men was ready, from which appointments were made as soon as their services were required after the declaration of war. Over 2,000 applications were received, but only a small proportion examined. Out of this number 42 were appointed assistant surgeons. They have rendered efficient service and have been a credit to the Navy. Some have had unusual and trying experiences, but they have accommodated themselves to their environments and have justified their appointments.

One of their number, Asst. Surg. John Blair Gibbs, was killed in action at Guantanamo while serving with the marine battalion. He was the only medical officer killed during the war.

In addition to the above appointments, 11 passed assistant and 8 assistant surgeons were mustered into the service with the naval reserves from the several States.

The question of proper care and transportation of sick or wounded at sea had long been a subject of consideration by the Bureau. The coming of war gave it an opportunity to demonstrate the wisdom of its propositions and the efficiency of its methods. By direction of the President, and by the authority of the Secretary of the Navy, the steamer *Creole*, of the Cromwell Line, between New York and New Orleans, was purchased, and designated as an ambulance ship. The vessel was sent to the yard of the Newport News Shipbuilding and Dry Dock Company, and there fitted out on the plans of the Bureau. The work was done under the Bureau of Construction and Repair, and under the immediate superintendence of Naval Constructor J. J. Woodward, to whom the Bureau is under lasting obligations for his advice, assistance, and his energy in satisfactorily completing the work. The merchant ship *Creole* became the ambulance ship *Solace* in sixteen days, fitted with a large and well-lighted operating room, in which were all the appliances for modern antiseptic surgery, a steam disinfecting apparatus, an ice machine, a steam laundry plant, cold storage rooms, and an elevator for taking patients from the operating room and upper deck to the wards below.

The *Solace* is fitted out under the requirements of the Geneva Convention, and flies the Geneva cross flag. She is the pioneer in her work, and indicates a step in advance that it well became the United States to take. Her fitting out was easy of accomplishment. The chief of every bureau in the Department having to do with the vessel gave his cordial support and assistance to the work. They gave the *Solace* everything she needed. The vessel has been fortunate in her personnel. Commander Dunlap is an ideal commander, and the medical officers of the vessel, Surgeon Streets and Passed Assistant Surgeons Stokes, Smith, and Bogert, have shown themselves thoroughly competent and efficient in caring for the many sick or wounded who have been under their charge. Three hospital stewards, one of whom was a skilled embalmer, eight trained nurses, a cook, four messmen, and two laundrymen were especially designated for service in the Medical Department.

The *Solace* is built of steel; 3,801 tons; 375 feet long; 44 feet beam; draws 21 feet, and has a continuous speed of 16 knots. She can comfortably accommodate 200 patients, either in berths, swinging cots, or staterooms. The hurricane deck aft is inclosed with canvas for use as a contagious ward, if required. She carries 37,000 gallons of fresh water in tanks, and 800 tons in her double bottom. Distillers and evaporators keep up the supply.

As soon as the *Solace* received her stores she sailed for the blockading squadron and arrived in time to take on board the wounded at the bombardment of San Juan. She then collected the sick or wounded from the other vessels of the squadron and sailed for New York, where, on June 5, 57 patients were landed at the naval hospital.

On June 8 she sailed for Guantanamo, and was present to take on board the wounded marines in their fight with the Spanish troops.

As soon as the Spanish fleet was destroyed in the battle of July 3 she took on board the wounded from the *Brooklyn* and all the Spanish wounded, and gave them the care and attention that has never before been given to the wounded of friend or foe in any naval combat and that could only be given by an ambulance ship. As it was the policy of the Department to bring all the sick or wounded from Southern waters to Northern naval hospitals as soon as practicable, so that they might have a better chance for recovery, and there was still space left on the *Solace* for wounded men, she went to Siboney and took on board 44 Army wounded and sailed for Hampton Roads on July 12. On July 16 she landed 44 Army wounded at Fortress Monroe and 55 Navy sick or wounded and 48 Spanish wounded at the naval hospital, Norfolk. She then went to New York for coal, stores, and an additional ice plant, and sailed August 2 for Key West, where she took on board the sick from the hospitals and vessels in port, and then visited all the vessels on the blockade around Cuba, taking off their sick or wounded and leaving stores. After receiving at Guantanamo the sick brought by the *Gloucester* from the vessels around Porto Rico, she sailed for Boston, and on August 29 landed 74 sick from the Navy and 2 sick soldiers at the Chelsea Naval Hospital. She then coaled and went to New York for repairs and stores, and sailed September 22 for Guantanamo with orders to deliver stores and supplies to all vessels in Cuban or Porto Rican waters, take on board their sick, and then return to New York, bringing, in addition, as many sick or wounded of the Army as the vessel could accommodate.

On every trip of the *Solace* she has gone loaded with medical stores and supplies, and also with delicacies and comforts, which have been supplied in abundance for the sick or wounded by generous and patriotic individuals and societies from every part of the United States. Among the contributions to the *Solace* were a carbonator and deck awning from the Rhode Island Sanitary and Relief Association, an X-ray apparatus from the National Society of Colonial Dames, and conveyance boxes for sterilized dressings from the Elizabeth (N. J.) members of the National Society of Colonial Dames.

In this war woman has done her perfect work, and the Medical Department of the Navy is profoundly grateful for the money contributed and supplies furnished for the aid and comfort of the sick or wounded of the Navy. Patriotic women have ably supplemented the efforts of the Government, and their assistance has been thoroughly appreciated.

The contributions soon became so numerous that it was necessary to have a medical officer detailed to receive them. Medical Director Bloodgood was assigned to the duty, and he has received and distributed the stores and attended to the voluminous correspondence with the same business ability he manifested when on the active list.

Four young women from the Johns Hopkins Medical School volunteered their services as nurses, and were assigned to duty at the naval hospital, Brooklyn, N. Y. Six women nurses from the registered list of the Daughters of the American Revolution and five Sisters of Charity at Norfolk also volunteered, and were assigned to duty at the naval hospital, Norfolk, Va. All of these women have done their work thoroughly and conscientiously.

The medical officers of the Naval Reserves, who were transferred to the service with the reserves from their States, rendered efficient service and willingly responded to every call made upon them.

The Bureau is under obligations to the Surgeon-General of the Army and to the Supervising Surgeon-General of the Marine-Hospital Service for caring for the sick or wounded of the Navy in the hospitals under their charge at Key West.

When the Department decided to remove the prisoners from the destroyed Spanish fleet at Santiago to Portsmouth, N. H., immediate preparation was necessary to care for the sick. Two pavilions were built, from plans already prepared, adjoining the naval hospital at Portsmouth. Telegraphic orders were issued for bedsteads, mattresses, bedding, stores, and supplies. Additional medical officers and nurses were sent, and when the vessels arrived with the prisoners the well men found comfortable barracks and the sick comfortable hospitals, to which they were immediately transferred. They were lodged, fed, and clothed as though they were expected guests. The Navy has reason to feel proud of this five days' work. One hundred equipped cots and six trained nurses were generously supplied by the Red Cross Society after the hospital was established.

On June 17 the President approved an act of Congress organizing a hospital corps of the Navy. The passage of this act is the culmination of the efforts of the Bureau for many years. It will give the service a trained corps of men who will now have some reason for remaining in service, having a hope of promotion and advancement as the result of faithful service, sobriety, and attention to duty. Its good results are already manifest; changes are being made as rapidly as practicable, and nearly all of the hospitals are now supplied with trained nurses, and in many of them are apprentices undergoing instruction. The examination for admission is rigid, and there will be more admissions to the corps when the end of the war releases from service many of the trained nurses now employed in other departments.

I can not close this portion of the Bureau's report without bearing testimony to the efficiency, skill, and devotion to duty of the personnel of the Medical Department. Not a word but of praise has the Bureau heard of any of them—regulars or volunteers. When war was imminent they vied one with another in their efforts to get on fighting ships. Some have had greater opportunities than others, but all have done well the work assigned them. Surgeon Edgar saw his associate, Assistant-Surgeon Gibbs, shot by his side in the Spanish attack, and he continued his work alone, doing it thoroughly and well, as it was known he would.

The medical officers of the vessels in the fight at Manila and in the battle of the 3d of July shared the dangers of their comrades, and should participate in the praise accorded to them.

The medical officers of the *Solace* have the honor of inaugurating the first complete system of antiseptic surgery at sea. They have adapted means to ends, have improvised apparatus, have been fertile in expedients, and have the satisfaction of having demonstrated that with skill and intelligence the percentage of mortality among the patients on a well-equipped ambulance ship will be no greater than in the hospitals on shore.

Medical Inspector Persons found himself suddenly confronted with 226 Spanish sick or wounded prisoners in a hastily established hospital. He was equal to the emergency, and he and his associates were complimented by Admiral Cervera when he visited the camp.

The medical officers of the other hospitals have had sudden large accessions of patients. They were always ready and always cared for them well.

The director of the laboratory (our receiving and distributing depot of supplies) applied his well-known energy to the work, and never failed to have supplies ready whenever and wherever required. Those whose services have not been so conspicuous have done their duty in the stations assigned them, and have contributed their share toward the efficiency of the Medical Department of the Navy.

NAVAL HOSPITAL FUND.

The condition of this fund is as follows:

Balance on hand July 1, 1897	$232,482.20
Transferred to the credit since July 1, 1897	121,876.84
Credit by appropriation for fiscal year 1898	20,000.00
	374,359.04
Expended since July 1, 1897	188,426.77
Balance on hand June 30, 1898	185,932.27

ESTIMATES.

Estimates have been submitted for two stenographers and typewriters, each at $1,000. The two stenographers and typewriters are a necessity. There are none now on the regular roll of the Bureau. The work is being done by detailed men. It must be done by someone, and it should be done by the regular Bureau force.

Naval cemetery, United States naval hospital, Chelsea, Mass.—An estimate of $2,500 is submitted for renovating the naval cemetery, United States naval hospital, Chelsea, Mass., for building fences to inclose cemetery, laying out approaches and paths, caring for graves, resetting headstones, and general renovation.

The cemetery at the naval hospital, Chelsea, has recently been relocated, and has never received the care and attention it should, in consequence of insufficient general appropriations.

Naval hospital, Chelsea, Mass.—An estimate of $45,000 is submitted for the repairs and renovation of the United States naval hospital, Chelsea, Mass., for building annex for kitchen, bathroom, closets and lavatories, furniture and fittings, and general renovation of hospital and appendages.

The amount asked for the improvement and renovation of the naval hospital, Chelsea, is urgently needed, and it is requested that it be made available immediately upon the approval of the act making appropriations for the naval service for the fiscal year ending June 30, 1900.

The kitchen is in the main building, on its dark side. The odors from it permeate the whole hospital. All of its furniture and fittings are old and worn out. The closets, lavatories, and bathrooms are in the center of the building, away from all direct light or ventilation. It is impossible to keep them in sanitary condition. They are a constant menace to the health of the patients.

GENERAL REPAIRS AT NAVAL HOSPITALS.

Naval hospital, Widows Island, Me.—No repairs have been made at this hospital during the past year. The Bureau would repeat its recommendation, contained in several previous reports, that the Department obtain Congressional action for the disposal of this property upon the most advantageous terms and at the earliest practicable time.

Naval hospital, Portsmouth, N. H.—During the year a substantial frame stable has been constructed. An ambulance of approved design, complete and modern in equipment, has been furnished this hospital, and which has added greatly to the facilities for the transportation of the sick and wounded officers and men of the Navy. The tubes of the hospital boilers have been renewed, the water tank in the attic of the hospital has been relined, and substantial repairs have been made to the roof of the hospital porch. The hospital sewer has been renewed, with increased facilities for flooding.

Naval hospital, Chelsea, Mass.—During the year many minor improvements and repairs have been made that add materially to the efficiency of this establishment. A steam disinfector of approved pattern has been installed and extensively employed. The bacteriological, chemical, and microscopical laboratory has been completed and fully equipped, and the hospital has been furnished with an outfit of modern surgical instruments. Repairs have been made to the water, steam, and electric plants, and changes have been made in the roofs of the ambulance shed and coal shed. The sills in the stable have been renewed, the foundation of the sea wall has been strengthened, and the protection of the foundations of the barn has been secured by an outer brick and cement wall. The substitution of a wrought-iron fence for the brick wall on Broadway, authorized by act of Congress, approved March 3, 1897, has been completed and presents a satisfactory appearance. The Bureau has submitted an estimate of $45,000 for the complete rehabilitation of this hospital.

Naval hospital, Newport, R. I.—Considerable work has been done in connection with the grading of the hospital roads and caring for the grounds. A new fire main has been installed; the building has been painted, the main wards of the hospital thoroughly renovated, and minor repairs have been made to the sewerage system.

A detailed report of the hospital for contagious diseases, authorized by Congress and approved May 4, 1898, will be found among the "Special repairs at naval hospitals."

Naval hospital, New York, N. Y.—The extensive repairs and additions to this hospital, which have been referred to in the two prevous reports, have been completed, affording not only ample accommodations for the increased demands of the service but offering every facility for the proper care and treatment of the sick. Extensive improvements have been made in connection with the roads and walks about the grounds, the main street having been paved. Considerable work has been done to the hospital roof, walls, and floors, and the water pipes have been extended and covered.

A more detailed description will be found under "Special repairs and improvements at naval hospitals."

Naval hospital, Philadelphia, Pa.—Important improvements have been made at this hospital by the putting in of two Keystone filters, which are connected with tanks in the attic.

Additions to the provisions against fire have been made, a fire plug similar to that used by the city fire department having been conveniently placed.

Extensive alterations have been made in the kitchen, the walls having been covered with vitreous tiling in the vicinity of the ranges, three new cooking ranges installed, and an improved hot-water boiler introduced.

Minor repairs have been made to engine house, laundry, and main building; also, an extensive system of electric bells installed and additions made to the bacteriological laboratory.

Naval hospital, Washington, D. C.—Other than supplying a heating outfit to the attic ward, utilized for the treatment of diphtheria cases, the repairs and improvements to this hospital have been unimportant.

Naval hospital, Norfolk, Va.—The accommodations have been greatly increased by the fitting up of the south wing with 90 new iron bedsteads; 50 aseptic ward tables were also provided.

General repairs have been made to hospital building and considerable work done on the roads and grounds. Minor repairs and additions have been made to laundry, operating room, boilers, electric-lighting system, and hospital furniture.

Naval hospital, Pensacola, Fla.—No repairs have been made to this hospital during the past year, the only work, outside of that performed by the employees in caring for grounds and buildings, having been the installation of a telephone line from the navy-yard and the erection of lightning rods over the various buildings.

Naval hospital, Mare Island, Cal.—On the night of March 30, 1898, the hospital was so seriously damaged by an earthquake that a board ordered to examine into the condition of the building reported that the main portion of the hospital was unsafe and should be immediately abandoned, and recommended the construction of a new building, a description of which will be found in the special reports on repairs and improvements at naval hospitals.

Naval hospital, Yokohama, Japan.—Minor repairs have been made to the buildings during the past year, and unimportant additions made to the hospital furniture and outfit.

Naval hospital, Sitka, Alaska.—The condition of the building at this station, the third floor of which is utilized for hospital purposes, urgently demands the erection of a small hospital. The building was constructed in 1840 by the Russian Government for use as a sail loft, and later, as a fish house.

The lower floor is fitted up as a carpenter and blacksmith shop, and the smoke from the forge at times is so thick in the wards as to make the conditions almost unendurable for the patients under treatment. It is built of logs and weatherboarded, and is now old and gradually rotting down, so that at times it sways back and forth with high winds and is in danger of collapsing.

The piles on which one-half of the building is placed are entirely rotten; in fact, they can be pulled to pieces by hand, causing that portion to have settled 22 inches in 24 feet.

The Bureau has recently directed that a survey be held upon the present building in order to determine its future disposition. Should the board recommend the construction of a small hospital, the building could be located upon a hill in the Government reservation back of the town site, where the sanitary conditions are excellent.

SPECIAL AND CONTEMPLATED IMPROVEMENTS AND REPAIRS AT NAVAL HOSPITALS.

Naval hospital, Portsmouth, N. H.—The Department having determined to transfer all Spanish prisoners of war of Admiral Cervera's fleet (captured in the battle of July 3, 1898, off Santiago, Cuba) to the navy-yard, Portsmouth, N. H., the Bureau, upon the receipt of official information to the above effect, directed the construction and equipment of two pavilion frame wards, with a combined capacity of 120 beds, for the accommodation of such prisoners as might require medical treatment.

Naval hospital, Newport, R. I. (hospital for contagious diseases).—The need of a detached building for the proper care, treatment, and isolation of contagious and epidemic diseases was recognized as peculiarly adapted to meet the requirements of this station soon after the main hospital building was completed.

The Naval Training Station, Newport, R. I., is the central rendezvous for the enlistment and training of all naval apprentices, who, on account of their age (14 to 18 years), are singularly susceptible to the influences of all diseases of a contagious or infectious nature.

Congress, in the act making appropriations for the naval service for the fiscal year ending June 30, 1899, made the following provision:

> Hospital for contagious diseases: For hospital for contagious diseases at Newport, Rhode Island, six thousand five hundred dollars.

As soon as the appropriation became available, and in accordance with the authority contained in the above act, plans and specifications were prepared under the supervision of the Bureau; the work was advertised for June 10, 1898, and bids opened at 1 p. m., June 28, 1898. The following proposals were received, viz:

William F. Wilbur and F. E. Manchester, Newport, R. I	$9, 834
James M. Gillies, Newport, R. I	9, 842

As all of the bids received were in excess of the amount appropriated by Congress for this purpose ($6,500), no award was made. The Bureau, after making certain modifications in the plans and specifications of the proposed hospital building, again advertised for this work on July 13, 1898, and bids were opened at 1 p. m., July 26, 1898.

The following proposals were received, viz:

Charles C. Currier, Newton, Mass	$8, 700
Robert W. Curry, Newport, R. I	6, 428
W. F. Wilbur and F. E. Manchester, Newport, R. I	6, 398
Thomas Lonergan & Co., Chicago, Ill	5, 950
Meads & Reynolds, Washington, D. C	5, 800

The firm of Meads & Reynolds, being the lowest bidders, were awarded the contract on August 9, 1898.

The plans and specifications call for a one-story building, with a capacity for 12 beds; the foundation, underpinning, piers, and area walls to be of stone; footing courses of concrete; superstructure of wood; porch piers of stone; and partition walls in basement of brick; roof of building to be covered with slate; roof of veranda and porch to be covered with tin.

The contractors have commenced work, and it is confidently believed that the building will be completed within three calendar months, the time specified in the contract.

Naval hospital, Brooklyn, N. Y.—The contracts for "Improvements and repairs" entered into by the Bureau with Isaac A. Walker & Son, dated October 17, 1896, for the rehabilitation of the old hospital building, and with P. J. Carlin & Co., dated December 14, 1896, "for the erection and completion of an additional building at the hospital," have both been completed during the year; the former on September 30, and the latter on November 20, 1897. Besides the above work, many improvements and repairs have been made to the outbuildings and grounds within the hospital inclosure.

In the main building changes and alterations in many of the rooms have been made—connecting some, dividing others, providing bath, basin, and closet for each officer patient, tiling corridors, passageways and vestibules of first story with 2½-inch white vitrified tile; new kitchen arranged and furnished; new floors of 2-inch yellow pine laid in upper corridor and in most of the rooms of first and second stories; beams projecting into hot-air flues in former mess hall in basement supported by iron columns sawed off, and sides of flues bricked up; replacing of old skylights above north and south corridor stairways; putting up two fire escapes; covering steam and water pipes in basement and túnnel; and the building has been wired for electric lights by the "steel armored conduit system."

The new "court building" of two stories and basement has been finished, connecting by corridors with main building, the basement containing two dining rooms for patients and employees, while the first story was designed especially for the purposes of a dispensary and chapel, and the second arranged for surgical work. The dispensary has been fitted up with new furniture, and the operating room with a perfect sterilizing plant for steam and dry sterilizing and all necessary movable furniture, and is well adapted for all possible requirements.

Elevator.—An Otis elevator, with electric engine and all other necessary electric appliances, has been installed. The car is 8 feet by 4 feet, giving sufficient room for a cot and two attendants, with a door at end and side sufficiently large for easy entrance and exit.

The contract requirement of an 1,800-pound load at a speed of 150 feet per minute was exceeded both as to weight and time.

New ward building.—This building is of buff brick, with Hallowell granite trimmings, 143 feet in length, and has a frontage of 51 feet 8 inches, containing a basement and two stories, the first and second stories being on a level with the same stories of the main building, with the first story of which it connects by a corridor. Each story contains a ward 46 by 85 by 15 feet, with bath room, lavatory, and closets, accommodating 44 patients, an office room and bath for a medical officer, and a bedroom and bath for a nurse. The attic, in which is situated a central ventilating chamber, contains an electric-motor fan and a steam heating coil.

The building is heated by steam, the radiators being placed in spaces under the windows, cased in by galvanized iron. Ventilation is by direct and indirect methods, air entering through grated frames outside under each radiator, rising to ceiling, and escaping through flues between windows. The point of entrance of air being near the floor, the natural flow of the current of air in the flues is assisted by aspirating coil and motor in the ventilating chamber, so that the flow will be about 7 feet per second, not sufficient to cause a draft, the air escaping through the ventilator at top of building. By this system the amount of air circulating through each ward, with doors and windows closed, amounts theoretically to about 164,000 cubic feet, warmed to the temperature of 80° F., enabling an increased number of patients to be placed in each ward if necessary. There are no rooms for officer patients, the building being designed for enlisted men only, and doubles the capacity of the hospital.

Electric wiring is by hidden steel conduit—two wires in one tube—system and fixtures uniform with those of kitchen and court building.

Corridors.—A corridor 162 feet long, 15 feet wide, and 15½ feet high affords communication between the new and the old wards and other buildings, leaving the new building in rear of first-floor ward, connecting with main building by a side corridor to the south wing, and terminating in the corridor connecting the kitchen with the court building.

Large windows on each side throughout length of corridor afford abundant light and the greatest amount of sun rays attainable from an eastern exposure, so that it may also be used as a solarium, the width being sufficient to allow plants, tables, chairs, etc., to be placed without obstructing passageways.

The wiring for electric lights is by the same system as the wards, with combined fixtures of the same kind, and heating is by long coils of sufficient radiating capacity estimated to keep the corridors at 70° F. in zero weather. The Bolles revolving sash, with which the corridor as well as the new building is supplied, will enable the windows to be so opened in the summer as to afford an unobstructed flow of air across the corridor.

Brick pavement.—The cobbles have been removed from the main roadway, and a pavement of hard-burned red Catskill brick has been laid on a 2-inch bed of sand from the main entrance gate to and including the side road on north side of hospital. It has received hard usage from the heavy wagons loaded with dirt for grading the paddock, but has stood the wear well, and gives promise of a smooth and enduring road.

Ornamental gate.—A large ornamental iron gate of similar pattern and improved construction to the one at the main entrance, and 4 feet wider, has been placed at the lower front entrance at Ryerson street, and from this point commences the macadam road.

Macadam road.—A new roadway has been laid out and partially completed under the direction of yards and docks. This roadway is 18 feet wide and has uncompleted gutters of hard-burned brick along a part of its course.

Grading by new boundary wall.—All the earth to the city grade has been removed on the city side of the new boundary wall, and on the inside, the embankment has been sloped to about 6 feet below the coping of the retaining wall.

A new tin roof has been put on the stable, and that on the medical director's residence has been repaired.

Grading of paddock.—About 2,500 loads of earth have been hauled into the paddock back of the stables, making it level and bringing up the grade to a point near the stable, with a slight descent toward the wall.

The trees in the grounds have been trimmed, a great deal of dead and dying material, including dead trees, has been removed, and a flag crossing laid on Flushing avenue opposite the entrance to the gate.

Naval hospital, Port Royal, S. C.—The naval appropriation bill for the fiscal year ending June 30, 1898, contained the following provision, viz:

> Naval hospital, naval station, Port Royal, South Carolina: For hospital at the naval station at Port Royal, South Carolina, four thousand dollars.

In accordance with the foregoing act, plans and specifications for a hospital building were prepared by Civil Engineer George Mackay, U. S. N., attached to the naval station, Port Royal, S. C., and, after approval by the Bureau, the work was advertised for July 12, 1897, and bids were opened at 1 p. m. August 3, 1897.

The following proposals were received, viz:

R. R. Legare, Port Royal, S. C. (informal)	
D. Getaz & Co., Knoxville, Tenn	$5,978
Simons & Mayrant, 15 Broad street, Charleston, S. C	4,575

The firm of Simons & Mayrant, 15 Broad street, Charleston, S. C., submitted the lowest bid. As their bid, however, was $575 in excess of the amount appropriated by Congress for the proposed hospital, the Bureau was unable to award the contract for this work, Messrs. Simons & Mayrant having declined to scale their bid within the amount authorized by law.

As there did not appear to be the least probability that the proposed hospital could be built for the amount authorized by Congress, the Bureau determined (after an urgent appeal from the commandant of the station, who represented the great necessity for the construction of a hospital, in connection with the sudden and growing importance and expansion of the station as a rendezvous for our ships of war) to supply the station with two portable Ducker hospitals of 12 beds each, also, an additional one-story frame building to be used for the purposes of a laundry, kitchen, etc.

The Ducker hospitals and outbuilding have been erected, the work finished, and furnished completely, and the medical department of the station is now equipped and prepared to meet any reasonable demands that the exigencies of the service might require.

The Bureau regrets to state that a cyclone of great severity visited the naval station, Port Royal, S. C., on the 30th of August last, and on the morning of August 31 the two Ducker portable field hospitals were completely wrecked.

Plans and specifications have been prepared by the civil engineer of the Port Royal station for the erection of two frame pavilion wards measuring 16 feet 6 inches by 42 feet, with piazzas on all sides, and each with a capacity of 10 beds, to take the place of the Ducker hospitals recently destroyed.

The two buildings will be constructed as soon as practicable, and when completed will probably be ample for all the needs of the medical department on this station for many years to come.

Naval hospital, Mare Island, Cal.—The present hospital building having been seriously damaged by an earthquake, which occurred on the night of March 30, 1898, a board of naval officers was ordered the following day (March 31, 1898) by the commandant of the station to hold a strict and careful survey upon its condition, and to ascertain, after a careful examination and inspection of the premises, whether the building could be satisfactorily repaired. The board reported, as a result of their investigation, that the hospital was beyond repair, and recommended that a new building be constructed.

As soon as practicable after the receipt of this information the Bureau transmitted to the Department an estimate of $100,000, with the recommendation that it be submitted to Congress, to be included in the naval appropriation bill for 1899, for tearing down and removing the present naval hospital building and appendages and erecting a new naval hospital at that place, and that the same be made immediately available upon the passage of the appropriation bill.

The Department forwarded the estimate with a favorable recommendation, and Congress, recognizing the importance and necessity for immediate action in this matter, embodied the following provision in the act making appropriations for the naval service for the fiscal year ending June 30, 1899:

> For tearing down and removing present naval hospital building and appendages recently destroyed by earthquake at navy-yard, Mare Island, California, and erecting a new naval hospital and appendages at that place, to be immediately available, one hundred thousand dollars.

As soon as the appropriation became available, and in compliance with the Department's instructions, Mr. William M. Poindexter, an architect of this city, was authorized by the Bureau to prepare plans, specifications, and detail drawings for the new naval hospital building.

The work was advertised for on September 1, 1898, and bids for the same will be opened in this Bureau at 1 p. m., October 12, 1898.

The new hospital will be constructed on the foundation walls of the old building, so far as the old work will conform to the new conditions and requirements. The plans and specifications of the new building provide for a generous increase of area for the administrative departments of the hospital on the first and second stories, and for eight suites of rooms (each suite consisting of a parlor, bedroom, bathroom, and water-closet) for sick officers on the third floor. The rear extension of the hospital provides ample accommodations for the kitchen, offices, and mess halls on the first floor; etherizing, operating and recovery rooms, dispensary and chapel, on the second floor, and bedrooms for the use of attendants on the third floor.

The basement of the entire building will be used for no other purposes than for general storage, water-closets, and one large room for a men's smoking room.

In every department of the proposed building particular attention has been bestowed on all sanitary matters and appliances, and to the most approved methods of heating, ventilating, and electric wiring.

The four wards will accommodate 20 beds each, but in an emergency this capacity can be doubled. Under each bed is provided a ventilating duct, through which the foul air will be drawn from the wards by exhaust fans in the basement, and expelled through ventilating shafts. The hospital will also be provided with an electric elevator, to travel from the basement floor to the level of the second floor, a distance of about 27 feet, at the rate of 100 feet per minute, and with a capacity sufficient to lift a net load of 1,000 pounds. The car will be of wrought iron, and fitted up with electric-light fixtures and all necessary attachments.

The building is to be of wood frame construction, of a most substantial character, and the exterior and interior finish of California redwood.

The specifications provide that "The contractor shall begin work within ten days after receipt of notice from the Bureau of Medicine and Surgery that it is ready for him to enter upon the work, and he must prosecute the work so as to complete the contract in all respects in six calendar months from the expiration of the said ten days."

CEMETERIES AT NAVAL HOSPITALS.

The improvements authorized by Congress for the cemeteries at the naval hospitals, Brooklyn, N. Y., and Norfolk, Va., have been completed.

An estimate for $2,500 has been submitted for renovating the cemetery at the United States naval hospital, Chelsea, Mass. This cemetery has recently been relocated, and has never received the care and attention necessary to place it in good condition, owing to the lack of sufficient general appropriations. It is earnestly requested that this estimate will meet with the approval of the Department.

NAVY-YARDS.

Navy-Yard, Portsmouth, N. H.—No contagious or epidemic disease has appeared during the year, and the general health of the station, as shown by the statistical report, has been excellent. This result has, however, depended in no small degree upon natural sanitary advantages, as the condition of the sewers has been unsatisfactory and has continued throughout the year to menace the health of the station.

Attention is also called to the deficient light supplied to the barracks, where, apparently, the pipes are too old and small to supply the burners. Eye-strain, resulting in injury to the eyes of the enlisted force on duty at the yard, would naturally follow present conditions.

Navy-yard, Boston, Mass.—The health of this yard during the past year has been satisfactory, the fourth quarter, in particular, showing an unusually small number of sick.

The diseases recorded during the year are confined to the ordinary casualties of the service, to venereal disease, and to simple disorders caused by climatic influences.

During the month of December three cases of parotitis epidemica were treated, contracted by exposure to the disease in Charlestown.

During the year an additional story has been placed on the marine barracks and the condition of the officers' quarters much improved. These additions have relieved the congestion in the dormitories, and add to the general sanitary efficiency of the barracks. The installation of electric lights has removed the objectionable factors of imperfect light and deterioration of atmosphere caused by the ordinary gas-burners formerly used.

Especial attention is called to the excellent condition of the military prison. The good effects of its efficient sanitation and thorough cleanliness, of its discipline, of the excellent food and employment in outdoor work, are shown in the good health and cheerful demeanor of its inmates.

Since the last report a desirable change has been made by the substitution of open ironwork in the lower tier of cells for the former solid woodwork.

The area of the prisoners' exercise yard has been largely increased. The plumbing and sanitary appliances of the officers' houses are in good condition.

Little improvement has been made in the sanitary arrangements—water-closets and drains of the shops—and should the yard again employ a large force, the accommodations would be inadequate.

Navy-Yard, League Island, Pa.—The health of the yard has been satisfactory, although it was feared that the turning up of the soil, in order to build dikes to retain the mud and water pumped from the basins under construction, would cause a material increase in the number of malarial cases. Such has not, however, proved to be the case, there having been only ten admissions during the year for malarial fever.

Two cases of typhoid fever occurred during the year, in one of which microscopical examination revealed the coexistence of malarial fever (tertian).

The water supply obtained from the artesian well recently completed is satisfactory.

By reason of the close proximity to the damp ground of the first floors of the buildings occupied by the officers and men of the relief marine guard, there were many complaints of rheumatic pains. The defect, however, has been remedied during the past year by raising the buildings and putting an additional story upon each house. Since this has been accomplished there has been no further complaint.

Navy-Yard, New York, N. Y.—The health of this yard has been exceptionally good, no infectious or contagious disease having made its appearance.

The following is a classification of the cases occurring among the workmen employed at the yard, in all of which preliminary treatment was given: Abrasio, 5; ambustio ex calore, 3; concussio, 2 (of which one case resulted in immediate death); contusio, 10; fractura, 1; stremma, 3; vulnus contusum, 40; vulnus laceratum, 40; vulnus punctum, 4; insolatio, 3.

There have been several trivial wounds inflicted by the careless handling of the new bayonet.

Navy-Yard, Washington, D. C.—As compared with the record of the preceding three years there has been a decided improvement in the health of this yard. This is attributable to favorable climatic influences, as there has been nothing done to improve the sanitary conditions.

The class of seaman gunners has been transferred to quarters where the best sanitary conditions possible at this yard prevail, with the result that the number of malarial cases among these men, which in 1896 amounted to 38 cases, only afforded 13 admissions and readmissions for 1897.

As stated in former reports, the prevalence of malaria at this station is attributable directly to the Anacostia flats, upon which the sewage of Washington, east of Fourteenth street, west, deposits itself, and from exposure to the sun's rays is responsible in great part for this condition.

Navy-yard, Norfolk, Va.—The health of the yard for the past year has been satisfactory, no serious cases of illness having occurred. Among the improvements that have been made on the station may be mentioned the dredging of the deposit along the water front, and its removal to the deep water of Hampton Roads; the extension of the stone quay, with a depth of 30 feet, preventing the accumulation of floating débris, which formerly encumbered the old wooden wharves, and the outlet sewers pass directly through the concrete walls, causing rapid removal of the sewage by the current.

A cistern for the collection of rain water, having a capacity of 860,000 gallons, has tended to better the health conditions, as the water from the driven wells is very unsatisfactory.

One hundred and two candidates for enlistment in the Marine Corps were accepted, and 39 rejected.

Navy-yard, Mare Island, Cal.—The health of this yard has been good, no illness of sufficient gravity to require special mention having occurred during the year.

Improvements have been made in the sanitary conditions, especially as regards installation of modern water-closets and connections, the old cesspools and drains having been disinfected and filled up. A separate building for the medical department of the yard is a great desideratum, as the part of the equipment building allotted for use as medical storehouse and dispensary is inadequate and not well adapted for such purposes.

NAVAL STATIONS.

Naval training station, Newport, R. I.—The sanitary condition of this station during the past year has been good. A case of scarlet fever developed on the 18th of August and was followed by fifteen admissions for this disease, the epidemic continuing until the 6th of November.

At times during the year the accommodations for the apprentices have proven inadequate.

Naval station, New London, Conn.—The health of this station during the past year has been excellent, no disease of an epidemic or contagious nature having occurred.

There have been fewer cases of malarial fevers in this vicinity during the past year than previously, which is to be attributed to the fact that the water in the adjacent ponds has not been drawn off.

An abundant supply of good potable water has been obtained from a well sunk near the commandant's house.

Naval station, Annapolis, Md.—The health of this station has been excellent, there having been exceptional immunity from epidemic, climatic, and local morbific influences during the year.

A reconstruction of the buildings of the Naval Academy upon a comprehensive scheme and in accordance with modern sanitary principles is urgently demanded.

A modern aseptic surgical operating room, completed during the year, has proven a valuable addition to the equipment of the medical department of the station, and the new chemical and bacteriological laboratory is nearing completion.

The X-ray apparatus in the laboratory of the department of physics and chemistry has been utilized by the medical officers with most satisfactory results in surgical diagnosis.

Marine headquarters, Washington, D. C.—The health of the post during the year has been satisfactory. The proportion of malarial cases, which in 1895 amounted to nearly 50 per cent of the number of admissions, and in 1896 to about 33 per cent, only reached a proportion of approximately 20 per cent in 1897.

Naval station, Port Royal, S. C.—The health of the station has been excellent. A significant fact has been the reduction in the number of malarial cases, there having been only 1 admission for 1897 as against 9 during the year 1896; this is probably due to careful filtering, and the avoidance of the water of surface wells.

The station is dependent on rain water, and, owing to the insufficient capacity of the cisterns, it is at times necessary to obtain water from Port Royal, which is invariably contaminated with salt water as a result of the leaky condition of the lighters in which it is transported. Work is being continued on the artesian well, but there appears no immediate prospect of a supply from that source.

Naval station, Puget Sound, Washington.—With the exception of the occurrence of several cases of articular rheumatism the health of this station has been good.

RECEIVING SHIPS.

U. S. receiving ship Wabash.—The change in the system of drainage of Boston, whereby the sewage of Charlestown was diverted from the old conduit, having its exit abreast the bows of the ship, to the Metropolitan system of sewers, continues to have a beneficial influence upon the health of the ship.

The percentage of success from vaccination has proven the excellent quality of the virus furnished, reaching 25 per cent for the year, notwithstanding the fact that of those vaccinated more than one-half were reenlisted men.

During the past year 858 persons were examined. Of this number 513 were accepted and 345 rejected. There were 27 candidates rejected for color blindness.

U. S. receiving ship Vermont.—The sanitary condition of the ship has been most satisfactory during the year.

Of the 3,367 persons examined for enlistment during the year, 1,232 were rejected physically, 37 of this number being for color blindness.

U. S. receiving ship Richmond.—The leading improvement made during the past year was the construction of a roof and house over the upper deck, at present almost completed. This will provide a practically unobstructed deck, comfortably heated, and affording space for recreation.

The desirability of providing the ship with incandescent lights is emphasized since the erection of the roof, much of the light being cut off notwithstanding the numerous windows and skylights which have been provided.

The ventilation of the lower decks is greatly interfered with by the mosquito screens inclosing all the space below the spar deck, in addition to which individual mosquito nets are indispensable to the average individual from July to October.

The water in which the ship is moored is but little affected by the tides and currents, and as a result is foul smelling and unsightly. Mooring below the piers, with protection from the ice, would prove the remedy.

The roughness of the gun and berth decks is most objectionable when considered from the standpoint of influencing such infections as grip, pneumonia, tonsilitis, etc. Shellacking has been and is strongly recommended.

During the past year 363 recruits have been examined; accepted, 191; rejected, 172. Apprentices examined, 236—accepted, 103; rejected, 133. Total number of examinations for the year, 599.

U. S. receiving ship Franklin.—The sanitary and general condition of the ship for the year has been excellent.

Malarial diseases continue to form a large proportion of the admissions, 26 out of 93 cases being ascribed to this cause.

During the year 381 men were examined for enlistment, of which number 245 were accepted and 136 rejected; of the total number examined 180 were for first enlistment, with which class the percentage of rejection was 53.33.

U. S. receiving ship Independence.—There has been a steady increase in the number of malarial cases on board this ship, due in all probability to the difficulty of keeping the bilges in good sanitary condition on account of old, useless water tanks and decaying chain lockers encumbering the main hold. This could be remedied by removing everything below the orlop decks and from the main hold, leaving an open and freely accessible space from stem to stern, which could be whitewashed, thereby doing away with a source of disease.

During the year 1,063 persons have been examined. Of this number 409 men and 147 apprentices were accepted and 211 men and 206 apprentices rejected.

NAVY PENSIONS.

The following statement embraces the work carried on under the pension division of the office during the fiscal year ending June 30, 1898.

There has been a considerable increase in the number of medical histories furnished the Pension Office, there having been answered 3,908 cases as against 2,696 for the previous year.

Notwithstanding the increase in the work and the additional labors incident to the exigencies of war, it has, with few exceptions, been the rule that pension calls have been answered on the same day as received. In furnishing information in connection with pension claims, it has been the aim of the Bureau to exercise the utmost promptness, maintaining at the same time accuracy and completeness of record as the first consideration.

Pension cases remaining on hand June 30, 1897	0
Received during fiscal year ending June 30, 1898	3,908
Answered during fiscal year ending June 30, 1898	3,908
Remaining on hand June 30, 1898	0
Cases for board of medical examiners received and answered	154
Cases for retiring board received and answered	32
Certificates of death received	417
Reports of medical survey received and acted upon	695
Cases from Judge-Advocate-General of the Navy received and answered	22
Cases from Civil Service Commission received and answered	12

MEDICAL ASSOCIATIONS.

International Conference of Hygiene and Sanitary Service on Railways and Shipboard—International Conference on Leprosy.—Surg. James D. Gatewood, U. S. N., represented the Medical Department of the Navy at the foregoing conferences, which convened at Brussels, Belgium, and at Berlin, Germany, respectively, during the year 1897. The purposes of the above conferences and the dates on which they convened were fully described in the Bureau's last report. Surgeon Gatewood's paper will be found among the special subjects embraced in the Bureau's report.

American Public Health Association.—The twenty-fifth annual meeting of the American Public Health Association was held at Philadelphia, Pa., October 26–29, 1897, and the Medical Department of the Navy was represented by Surg. D. O. Lewis, U. S. N. This association in its meeting at Ottawa, Canada, September 27–30, 1898, was represented by Medical Director T. C. Walton, U. S. N.

Ninth Congress of Hygiene and Demography.—The Spanish Government, having officially extended an invitation to this Government to send delegates to the Ninth Congress of Hygiene and Demography, to be held at Madrid from April 10–17, 1898, Medical Director J. R. Tryon, U. S. N., was appointed to represent the Medical Department of the Navy, and the Spanish minister was informed that Medical Director Tryon would present for discussion before the Congress a paper entitled "United States Museum of Hygiene, Washington, D. C.—Foundation, growth, advantages, and management."

Upon the adjournment of the Congress he was ordered to inspect and report upon the Museums of Hygiene of Paris and London.

His paper, which was read before the Congress, will be found among the special reports.

International Congress of Chemistry.—The Austro-Hungarian Government, through its minister at this capital, having requested that delegates be sent to the above Congress, to be held at Vienna from July 28 to August 2, 1898, Medical Director Flint, U. S. N., was selected to represent the Medical Department of the Navy.

International Congress of Hydrology, Climatology, and Geology.—Medical Director James M. Flint, U. S. N., was also ordered to represent the Medical Department of the Navy at the above Congress, which convened at Liege, Belgium, on the 25th of September, 1898, a request for delegates having been made officially by the Belgium Government through its minister at this capital. Medical Director Flint's papers on the proceedings of the two congresses will be published in a future report.

American Medical Association.—Owing to the need of the services of all medical officers, as a result of hostilities between this Government and Spain, the Medical Department of the Navy was unable to send delegates to attend the forty-ninth annual meeting of the above association, which convened at Denver, Colo., June 7–10, 1898.

Association of Military Surgeons of the United States.—The above association, which was to have convened at Kansas City, June 1–3, 1898, postponed its eighth annual meeting, owing to the fact that a large majority of its members were serving with the troops of the several States in the war between this country and Spain.

UNITED STATES NAVAL MUSEUM OF HYGIENE.

The medical director in charge of the Museum reports many changes and improvements at this establishment during the past year.

For the improvement of the water supply, which was pronounced insufficient by the city officials, a new 6-inch main was laid from the street, and two hydrants placed in positions designated by the chief of the fire department.

As a further protection against fire, the two fire plugs inside the building have been fitted with reducers, so that the regulation hose of the fire department can be attached to them; new hose, sufficient to reach any portion of the building, has been bought and is kept attached to the fire plugs at all times.

Owing to the elevation of the site on which the Museum building is located, the water pressure is insufficient for effective use in case of fire in the second story. It is hoped, however, that the new water supply to be furnished the city will remedy this defect.

Concrete pavement has been laid so as to extend along the whole front of the building, and the level of the gutters readjusted in order to allow proper drainage.

Many changes and repairs have been made in the internal arrangements of the building. Rooms have been fitted up and renovated thoroughly in connection with the chemical, bacteriological, and microscopical work of the Museum, and each of them supplied with all the instruments, appliances, and reagents that are deemed necessary for such investigations.

In the chemical department a large number of urinary and water analyses have been made; also, the determination of the specific gravities of iron and steel.

In the bacteriological department examinations have been conducted to test the efficiency of disinfectants, the quality of vaccine virus, and the potableness of waters, besides examinations of sputa for diagnostic purposes.

Photographs for exhibition at the Ninth Congress of Hygiene and Demography, held at Madrid, April 10–17, 1898, were prepared at the Museum, showing the character and extent of the hygienic exhibit, and an interior view of the rooms devoted to chemistry, bacteriology, and microscopy.

The room formerly occupied by the library was found to be too small to accommodate the books (amounting to nearly 12,000 volumes) belonging to the Museum, and a larger room was selected, the former being now used for the Museum exhibit.

OUTBREAK OF YELLOW FEVER AT KEY WEST, FLA.

Upon the commencement of hostilities between this country and Spain, the Navy Department ordered a flag officer in command of the naval station at Key West, Fla., and a short time afterwards designated it as a naval base for all vessels acting in southern waters.

In order to provide for all possible contingencies, and to meet the demands incident to a state of war that might be made upon it as a result of assembling in this harbor so large a number of war vessels, the Department landed at Key West a quantity of naval supplies, including ordnance stores, equipment materials, provisions, etc.

For the preservation of this property (valued at hundreds of thousands of dollars) it was deemed essential that suitable provision should be made for its protection. Early in June, therefore, 54 officers and men of the Marine Corps were transferred to Key West and located in a building well adapted for temporary quarters, and which had formerly been used as a cigar factory.

For several years previous to the present summer yellow fever, with the exception of an occasional sporadic case, had not made its appearance in Key West, but the location of the island, well within the limit of the yellow-fever zone, and the sudden concentration at this point of a large number of unacclimated persons belonging to the Army and Navy rendered it highly probable that, unless extra precautions were taken for the preservation of health, an outbreak of yellow fever could only be postponed for a short time.

The general unsatisfactory sanitary condition of Key West prevailing at this time, also, was such as to cause some uneasiness on the part of the Department, as it was but reasonable to infer that the exemption of the island from yellow fever for the past few years might be attributed to accident rather than to any special attention on the part of the officials to the enforcement of hygienic measures.

Although the duties devolving upon the marines were arduous and exacting, the health of the guard remained good until August 13, when the first suspicious case of illness among them made its appearance. On the morning of August 14 another marine was taken ill, and on the afternoon of August 15 three more cases were reported. The symptoms in all of the above cases were extremely suspicious, but before making a positive statement Assistant Surgeon Marcour decided to avail himself of the opinions of several yellow fever experts as to the diagnosis in the above cases. After a consultation between the local health officer of Key West and representatives from the Medical Corps of the Army, Navy, and Marine-Hospital Service, a definite conclusion was reached as to the nature of the disease, and on August 16 the Bureau was informed officially of the existence of yellow fever, and that a rigid quarantine had been established at Key West by the national and local health authorities.

Upon the receipt of this information, the commandant in charge of the United States naval base was instructed by the Department to send at once all naval vessels in the harbor of Key West to Hampton Roads (including the officers and men on temporary shore duty, with the exception of the marine guard), and to transfer to some suitable vessel for passage north the sick and wounded of the Navy, who could be removed without danger from the Army general and marine hospitals. Orders were also issued that no naval supplies stored in the several buildings at Key West should be removed, as it was not deemed safe to transfer them at this time for fear of spreading the infection. The commandant was further directed to have the sick marines isolated within the barracks then occupied by them, to place all suspects or suspicious cases in an adjoining house rented for the purpose, and to remove the well marines to the detention camp, which was situated on the south beach at a distance of about 3 miles from the barracks. Every provision was made for the care and treatment of the sick, and every precaution adopted for the protection and preservation of the health of the marines in the detention camp.

Asst. Surg. R. F. Marcour (a yellow fever immune) had been selected by the Bureau to accompany the marines when ordered on this duty, in anticipation of a possible outbreak of yellow fever. Eight immune nurses, one immune cook, and one immune watchman were also employed. On August 18 the number of cases under treatment had increased to ten, and as there appeared to be at that time every probability that the disease would develop in an epidemic form, the Bureau decided to detail an additional medical officer for this duty.

Surg. John W. Ross (a yellow fever immune) was temporarily detached from the navy-yard, Pensacola, Fla., and on August 23 arrived at Key West and assumed charge of all yellow fever cases.

The prompt measures, however, adopted by the medical officers in the immediate and complete isolation of the sick, the thorough disinfection of the quarters occupied by them, and the removal of the well marines to a place beyond the danger point of infection, resulted in localizing the disease, and on September 12 Surgeon Ross reported the appearance of the last case—that of Commander Forsyth—making a total of fourteen patients under treatment. The disease prevailed in a a mild form, and up to this time no deaths have occurred.

Upon the recommendation of Surgeon Ross, and with the approval of the Bureau, the Department ordered the transfer North of the marines, and on September 8 the guard left Key West on the steamship *Colorado*, and arrived in New York on September 14.

The *Colorado* was subjected to a thorough process of disinfection at the quarantine station, New York, and the bedding, mattresses, etc., of the marines were sent to the naval hospital, New York, where they were thoroughly disinfected before being placed in the barracks.

THE MEDICAL CORPS OF THE NAVY.

During the fiscal year ending June 30, 1898, the Department received 829 applications for information concerning the appointment of assistant surgeons in the Medical Corps of the Navy. During the same period permits to appear before the naval medical examining boards for examination for admission into the Medical Corps of the Navy were issued to 248 candidates, as follows:

Alabama	1	Michigan	9
California	6	Minnesota	4
Canada	1	Mississippi	2
Connecticut	10	Missouri	10
Delaware	1	Montana	1
District of Columbia	5	Nebraska	1
Florida	2	New Hampshire	4
Georgia	3	New Jersey	7
Illinois	12	New York	47
Indiana	7	North Dakota	1
Iowa	3	North Carolina	5
Kansas	5	Ohio	6
Kentucky	3	Pennsylvania	31
Louisiana	1	South Carolina	1
Maine	4	Tennessee	4
Maryland	6	Vermont	3
Massachusetts	24	Virginia	16
Mexico	1	West Virginia	1

Of the above number, 65 candidates appeared before the examining boards, of which 17 were rejected physically, 19 rejected professionally, 12 withdrew from further examination, and 17 were found physically and professionally qualified for admission as assistant surgeons in the Medical Corps of the Navy.

The successful candidates were appointed from the following States, viz:

California	1	Minnesota	2
Connecticut	1	New Hampshire	1
District of Columbia	1	New York	3
Delaware	1	Pennsylvania	2
Missouri	1	Virginia	4

Percentage of candidates accepted		26.2
Rejected physically	26.1	
Rejected professionally	29.2	
Allowed to withdraw	18.5	
Total percentage of candidates rejected		73.8

Upon the recommendation of the Bureau, and with the approval of the Department, Congress during the past session very wisely extended the age limit from 26 to 30 years for entrance into the Medical Corps of the Navy.

This legislation has been attended with most gratifying results, and for the first time in thirty-five years the number of officers in the Medical Corps of the Navy has reached the limit established by law.

Very respectfully,

W. K. VAN REYPEN,
Surgeon-General United States Navy.

The SECRETARY OF THE NAVY.

Estimates of appropriations required for the service of the fiscal year ending June 30, 1900 by the Bureau of Medicine and Surgery, Navy Department.

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year, ending June 30, 1899.
SALARIES.			
Bureau of Medicine and Surgery:			
Chief clerk (appropriated, act of Mar. 15, 1898)	$2,000.00		
One clerk of class 3 (same act)	1,600.00		
One clerk of class 2 (same act)	1,400.00		
One clerk of class 1 (same act)	1,200.00		
One clerk (same act)	1,000.00		
One laborer (same act)	660.00		
One janitor for naval dispensary (same act)	600.00		
One laborer for naval dispensary (same act)	480.00		
		$8,940.00	$8,740.00
Submitted.—Two stenographers and typewriters, each $1,000	2,000.00	2,000.00	....
Explanatory note.—The two stenographers and typewriters are a necessity. There are none now on the regular roll of the Bureau. The work is being done by detailed men. It must be done by some one, and it should be done by the regular Bureau force.			
MEDICAL DEPARTMENT.			
For surgeons' necessaries for vessels in commission, navy-yards, naval stations, Marine Corps, and Coast Survey, and for the civil establishment at the several naval hospitals, navy-yards, naval laboratory and department of instruction, museum of hygiene, and Naval Academy, $75,000. (Appropriated, act of May 4, 1898)	75,000.00	75,000.00	75,000.00

Estimates of appropriations required for the service of the fiscal year ending June 30, 1900, by the Bureau of Medicine and Surgery, Navy Department—Continued.

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year, ending June 30, 1899.
NAVAL HOSPITAL FUND.			
For maintenance of the naval hospitals at the various navy-yards and stations, and for care and maintenance of patients in other hospitals at home and abroad, $20,000. (Appropriated, act of May 4, 1898)	$20,000.00	$20,000.00	$20,000.00
CONTINGENT, BUREAU OF MEDICINE AND SURGERY.			
For freight, expressage on medical stores, tolls, ferriages, transportation of sick to hospital, transportation of insane patients; care, transportation, and burial of the dead; advertising; telegraphing; rent of telephones; purchase of books and stationery; binding of medical records, unbound books, and pamphlets; postage and purchase of stamps for foreign service; expenses attending the medical board of examiners; rent of rooms for naval dispensary; hygienic and sanitary investigation and illustration; sanitary and hygienic instruction; purchase and repairs of wagons and harness; purchase of and feed for horses and cows; trees, plants, garden tools, and seeds; furniture and incidental articles for the museum of hygiene, naval dispensary, Washington; naval laboratory, sick quarters at Naval Academy and marine barracks, surgeons' offices and dispensaries at navy-yards and naval stations; washing for medical department at museum of hygiene, naval dispensary, Washington; naval laboratory and department of instruction, sick quarters at Naval Academy and marine barracks, dispensaries at navy-yards and naval stations, and ships and rendezvous, and for minor repairs on buildings and grounds of the United States naval museum of hygiene, and all other necessary contingent expenses, $30,000. (Appropriated, act of May 4, 1898)	30,000.00	30,000.00	30,000.00
REPAIRS, BUREAU OF MEDICINE AND SURGERY.			
For necessary repairs of naval laboratory and department of instruction, naval hospitals and appendages, including roads, wharves, outhouses, sidewalks, fences, gardens, farms, and cemeteries, $20,000. (Appropriated, act of May 4, 1898)	20,000.00	20,000.00	20,000.00
NAVAL CEMETERY, UNITED STATES NAVAL HOSPITAL, CHELSEA, MASS.			
For building fence to inclose cemetery, laying out approaches and paths, caring for graves, resetting headstones, and general renovation, $2,500	2,500.00	2,500.00	1,000.00
NAVAL HOSPITAL, CHELSEA, MASS.			
Submitted.—For building annex for kitchen, bathroom, closets, and lavatories, furniture and fittings, and general renovation of hospital and appendages, $45,000	45,000.00	45,000.00	....
Explanatory note.—The cemetery at Chelsea Hospital has recently been relocated, and has never received the care and attention it should, in consequence of insufficient appropriation. The amount asked for improvement and renovation of naval hospital, Chelsea, is urgently needed and it is requested that it be made immediately available. The kitchen is in the main building, on its dark side. The odors from it permeate the whole hospital, All of its furniture and fittings are old and worn out. The closets, lavatories, and bathrooms are in the center of the building, away from all direct light or ventilation. It is impossible to keep them in sanitary condition. They are a constant menace to the health of the patients.			

STATISTICAL REPORT

OF THE

HEALTH OF THE NAVY AND MARINE CORPS FOR THE YEAR 1897.

The health record of the Navy and Marine Corps for the calendar year 1897 shows an improvement over that for 1896, the ratio of admissions to the sick list per 1,000 of strength being 748.24, as against 777.75 for the previous year. The rate for 1895 was 838.53.

The average strength of the active list for 1897 was 15,734, an increase in the force of the Navy and Marine Corps of 1,538.

Complete returns were received by the Medical Department from a force of 15,229, giving a difference of 505 persons from whom no regular returns were received, representing those on detached service and on leave. As reports of medical survey and certificates of death, however, are received from the total force, this strength is employed in computing ratios of deaths and discharges from the service for disability, and the average strength, as shown by medical returns, in calculating all other ratios.

The total number of admissions for disease was 9,053, and for injuries 2,342, affording a ratio per 1,000 of strength of 594.46 and 153.79, respectively. The ratios for 1896 were 628.42 and 149.33.

The daily average of patients was 454.08, giving a ratio per 1,000 of strength of 29.82 as against 29.71 for 1896. The total number of sick days was 165,741, giving an average of 10.88 days for each man of the Navy and Marine Corps, and 14.55 days as the duration of treatment per case.

In 1896 the average number of sick days for each man was 10.87, and the average number of days each case was treated, 13.98.

The number of persons invalided from service (including retirements of officers for disability and transfers to the Government Hospital for the Insane) was 328, a ratio of 20.85 per 1,000 of force; for previous year, 17.19.

Of the total discharges 281 were for disease and 47 on account of injuries.

The number of deaths was 88, giving a ratio of 5.59 per 1,000 of strength; the ratio for 1896 was 5.49.

Fifty-six of the deaths resulted from disease and 32 from injuries, including cases of poisoning.

During the year 841 cases of malarial diseases were admitted to the sick list (850 in 1896), 710 of wounds (593 in 1896), 573 of rheumatic affections (586 in 1896), 526 of diarrhœal affections (468 in 1896), 81 of heat stroke (59 in 1896), 52 of typhoid fever (56 in 1896), 52 of pneumonia (66 in 1896), 58 of pneumonic tuberculosis (48 in 1896), 21 of scarlet fever (4 in 1896) and 3 cases of smallpox as against 5 cases for previous year.

There were no cases of yellow fever or cholera during the year.

There were vaccinated during the year 5,441 persons with a percentage of success of 34.03. This is an increase over the previous year when the percentage of success was 25.37.

RECRUITING.

The following table shows the record of enlistments and rejections for the year 1897:

Where examined.	Number examined.	Number accepted.	Number rejected.	Color blind.
Receiving ship Wabash, Boston, Mass.	858	513	318	27
Receiving ship Vermont, New York, N. Y.	3,367	2.135	1,195	37
Receiving ship Richmond, Philadelphia, Pa.	599	294	282	23
Receiving ship Franklin, Norfolk, Va.	381	245	132	4
Receiving ship Independence, Mare Island, Cal.	1,065	646	382	37
Marine rendezvous, Boston, Mass.	353	246	93	14
Marine rendezvous, New York, N. Y.	682	270	364	48
Marine rendezvous, Philadelphia, Pa.	346	135	194	17
Marine headquarters, Washington, D. C.	112	75	31	6
Marine rendezvous, San Francisco, Cal.	290	264	24	2
Cruising vessels and shore stations other than marine rendezvous and receiving ships	3.580	2,567	952	61
Total	11,633	7,390	3,967	276
RECAPITULATION.				
Receiving ships	6,270	3,833	2,309	128
Marine rendezvous	1.783	990	706	87
Cruising vessels and shore stations	3,580	2,567	952	61

Number rejected per 1,000, 341. Color blind per 1,000, 23.

INSANE OF THE NAVY.

Number of patients from the Navy and Marine Corps in the Government Hospital for the Insane on June 30, 1897	80
Admitted during the year (3 officers and 26 seamen and marines)	29
Total	109
Discharged during the year (13 died, 4 recovered and 1 eloped)	18
Remaining in that institution June 30, 1898 (9 officers and 82 seamen and marines)	91

NAVAL HOSPITALS.

SUMMARY FOR THE YEAR 1897.

Cases met with in the hospitals appear, as a rule, in the returns from the stations where the disease or injury was contracted. All such cases are indicated in Table XV (p. 77), in the column "Readmitted," while diseases or injuries first recorded in hospitals appear in the same table in the column "Admitted," and are regarded as original admissions.

NAVAL HOSPITALS, 1897.

Hospitals.	Number of cases under treatment.				Number invalided from service.				Number dead.				Number discharged to duty.				Average number daily under treatment.	Average number of days' treatment per case.
	Remaining from last year.	Admitted during the year.		Total.	Diseases.	Injuries.	Total.	Ratio per 1,000 of cases treated.	Diseases.	Injuries.	Total.	Ratio per 1,000 of cases treated.	Diseases.	Injuries.	Total.	Ratio per 1,000 of cases treated.		
		Diseases.	Injuries.															
Portsmouth, N. H	7	42	6	55	1	......	1	18.18	......	......	......	....	42	6	48	872.73	5.22	34.60
Chelsea, Mass	29	103	9	141	23	5	28	198.58	2	1	3	21.28	82	2	84	595.75	21.69	56.14
Newport, R. I	......	236	28	264	......	1	1	3.79	5	......	5	18.94	222	26	248	939.39	10.54	14.57
Brooklyn, N. Y	54	355	60	469	65	10	75	159.92	6	1	7	14.93	197	45	242	515.99	63.35	49.30
Philadelphia, Pa	22	177	19	218	22	5	27	123.85	3	......	3	13.76	152	13	165	756.88	20.20	33.82
Washington, D. C	19	128	19	166	9	1	10	60.24	1	......	1	6.02	124	20	144	867.47	15.55	34.18
Norfolk, Va	28	278	31	337	35	2	37	109.79	4	......	4	11.89	224	20	244	924.04	30.73	33.28
Pensacola, Fla	......	10	......	10	1	......	1	100.00	......	......	......	....	7	......	7	700.00	.98	35.80
Mare Island, Cal	54	243	33	330	45	12	57	172.73	8	1	9	27.27	165	25	190	575.76	52.17	57.71
Sitka, Alaska	......	23	9	32	......	......	......	....	......	......	......	....	20	9	29	906.25	2.24	25.50
Yokohama, Japan	5	67	5	77	11	1	12	155.84	3	2	5	64.94	47	2	49	636.36	10.71	50.74

NAVAL HOSPITALS.

The average number of patients daily under treatment in the various naval hospitals was 233.38, a ratio of 15.32 per 1,000 of force.

During the previous year the daily average was 194.84 and the ratio per 1,000 of force, 14.15.

The average number of days treatment per case was 42.50 for 1897 and 47.57 for 1896.

The deaths numbered 37 and the invalided from service 236, the ratio per 1,000 of cases treated being 18.46 for the former and 117.76 for the latter. The ratios for the previous year were 22.01 and 113.41, respectively.

The diseases most prevalent and the causes of deaths and invaliding are shown in the following detailed statement of the various hospitals:

NAVAL HOSPITAL, PORTSMOUTH, N. H.

(*Statistics.*)

Medical Inspector J. B. Parker, U. S. N., *In charge.*

During 1897 there were 55 cases under treatment, of which 7 were continued from the previous year.

The average number daily under treatment was 5.22, as against 5.84 for the previous year.

The average number of days' treatment per case was 34.60; for previous year, 35.07.

There was but one discharge from the service for disability, the cause being senile debility. The ratio per 1,000 of all cases under treatment was 18.18; for previous year, 32.79. There were no deaths, as was the case in 1896.

Venereal diseases.—There were only 2 venereal cases under treatment during the year, 1 each of secondary syphilis and gonorrhœa.

NAVAL HOSPITAL, CHELSEA, MASS.

(*Statistics.*)

Medical Director J. H. Clark, U. S. N., *In charge.*

There were 141 cases under treatment during the year, including 29 remaining from 1896, an increase of 32 when compared with the previous year. The average number of cases daily under treatment was 21.69, as against 16.02 for 1896.

The average number of days' treatment per case was 56.14; for previous year, 53.78.

Of diseases of an epidemic nature there were 5 cases under treatment during the year, 1 of measles and 4 of mumps.

The ratio of deaths per 1,000 of those under treatment was 21.28, as against 27.52 for 1896.

There were 28 cases invalided from the service, giving a ratio of 198.58 per 1,000. The ratio for the previous year was 91.74 per 1,000.

The causes were as follows: Rheumatic affections, 5 cases; hernia, 4; diseases of the respiratory apparatus, 4; cardiac affections, 3; venereal diseases, 3, and intermittent fever, anæmia, meningitis, neurasthenia, chronic rhinitis, arthritis, and punctured wound, 1 each. Two cases were invalided to the Government Hospital for the Insane, one of melancholia and one of dementia.

NAVAL HOSPITAL, NEWPORT, R. I.

(Statistics.)

Surgeon C. A. SIEGFRIED, U. S. N., *In charge.*

During 1897 there were 264 cases under treatment. The average number daily under treatment was 10.54, and the average number of days' treatment per case was 14.57. The short period of treatment of the cases in this hospital as compared with that of other naval hospitals is due to the fact that many cases which ordinarily would be treated on board ship are received from the United States training ship *Constellation.*

Of diseases of an epidemic nature there were 5 admissions for measles, 21 for scarlet fever, and 19 for rötheln.

The epidemic of scarlet fever prevailed during the latter part of the third and the beginning of the fourth quarters of the year and was finally stamped out by the exercise of strict isolation and rigid sanitary measures. The last admission for the disease was on the 6th of November.

There were only 11 admissions for venereal disease.

One case was invalided from the service and 5 died—a ratio of 3.79 per 1,000 and 18.94, respectively.

The causes of death were: 2 from scarlet fever, and 1 each from pneumonia, acute phthisis, and perineal abscess.

NAVAL HOSPITAL, NEW YORK, N. Y.

(Statistics.)

Medical Director GEORGE W. WOODS, U. S. N., *In charge.*

During the year 1897 there were under treatment 469 cases, including 54 remaining from 1896. This was an increase in the admissions over the previous year of 73.

The average number of cases daily under treatment was 63.35, and the average duration of treatment 49.30 days, as against 46.85 and 43.30, respectively, for 1896.

Among the general infectious diseases treated were 19 cases of pneumonia, 3 of typhoid fever, 11 of acute articular rheumatism, 18 of phthisis, 10 of measles, 7 of mumps, and 2 of scarlatina. There were 107 admissions for venereal diseases, 43 of which were for syphilis.

The deaths numbered 7, giving a ratio per 1,000 of cases under treatment of 14.93, which ratio was 25.25 for 1896.

Two deaths resulted from phthisis, and 1 each from pneumonia, acute articular rheumatism, apoplexy, chronic nephritis, and alcoholism.

There were 75 persons invalided from the service, the principal causes being as follows: Phthisis, 11 cases; chronic nervous affections, 11, and venereal diseases, 9.

Six patients were transferred to the Government Hospital for the Insane, 3 each for dementia and mania.

NAVAL HOSPITAL, PHILADELPHIA, PA.

(*Statistics.*)

Medical Director GEORGE H. COOKE, U. S. N., *In charge.*

Two hundred and eighteen cases were treated at this hospital during the year, of which 22 remained from the previous year. The average number daily under treatment was 20.20, and the average duration of treatment per case 33.82 days, as against 19.69 and 37.33, respectively, for 1896.

Among the acute infectious diseases admitted were 6 cases of typhoid fever, 4 of pneumonia, and 4 of acute articular rheumatism. There were 62 admissions for venereal diseases.

Three deaths were reported from this hospital, giving a ratio of 13.76 per 1,000, as against 25.91 for 1896.

Twenty-seven persons were invalided from the service, the principal causes being phthisis, 4 cases; articular rheumatism, 3; venereal diseases, 7; and injuries, 5.

The ratio per 1,000 of those invalided from service was 123.85, as against 129.53 for 1896.

Sixty-three cases of venereal diseases were admitted during the year.

NAVAL HOSPITAL, WASHINGTON, D. C.

(*Statistics.*)

Medical Director GEORGE A. BRIGHT, U. S. N., *In charge.*

During the year 166 cases were under treatment at this hospital, 19 of which remained from 1896. The average number daily under treatment was 15.55 and the average number of days' treatment per case was 34.18, the record for 1896 being 13.06 and 34.14 respectively.

One death occurred at this hospital from pulmonary tuberculosis, affording a ratio per 1,000 of 6.02. This ratio for 1896 was 14.29.

Ten persons were invalided from the service, the causes being as follows: Palpitation of heart, 2 cases; epilepsy, 1; locomotor ataxia, 1; otitis media, 1; deafness, 1; chronic bronchitis, 1; chronic pleurisy, 1; eczema, 1, and hernia, 1.

The ratio per 1,000 of those invalided from service was 60.24 as against 42.86 for 1896. There were 57 cases of venereal diseases under treatment during the year, more than one-half of which were for gonorrhœa.

There were no transfers to the Government Hospital for the Insane from this hospital.

NAVAL HOSPITAL, NORFOLK, VA.

(*Statistics.*)

Medical Director C. J. CLEBORNE, U. S. N., *In charge.*

During 1897 there were 337 cases under treatment at this hospital, of which number 28 were continued from the previous year. The average number daily under treatment was 30.73, as against 36.03 for 1896.

The average duration of treatment per case was 33.28 days, a decrease from that of 1896, when the period was 40.58 days.

Among the acute infectious diseases treated were 8 cases of typhoid fever, 3 of pneumonia, 2 of measles, and 2 of acute articular rheumatism.

One hundred and three cases of venereal diseases were under treatment during the year.

There were 4 deaths, one each from phthisis, cerebellar abscess, appendicitis, and cancer affecting stomach and pancreas.

The ratio per 1,000 of cases treated was 11.89, as opposed to 24.62 for 1896.

Thirty-seven cases were invalided from the service, being at the rate of 109.79 per 1,000 of cases treated; previous year, 156.92; of those invalided 9 were by reason of venereal diseases, 8 from phthisis, 5 from chronic affections of the nervous system, 2 from rheumatic affections, 2 as result of injuries, and 1 each for senile debility, astigmatism, iritis, otitis externa, otitis media, chronic gastric catarrh, angina pectoris, valvular disease of heart, asthma, chronic bronchitis, and ankylosis.

NAVAL HOSPITAL, PENSACOLA, FLA.

(*Statistics.*)

Passed Assistant Surgeon H. N. T. HARRIS, U. S. N., *In charge.*

Ten cases were under treatment at this hospital during 1897, the causes of admission being as follows: Acute nephritis, 2 cases, and 1 case each of acute articular rheumatism, hemiplegia, anal fistula, icterus, bronchopneumonitis, abscess, cystitis, and chronic nephritis.

The average number daily under treatment was .98, and the average duration of treatment 35.80 days. There were no admissions to this hospital during 1896.

There were no deaths at this hospital during the year 1897.

NAVAL HOSPITAL, MARE ISLAND, CAL.

(*Statistics.*)

Medical Inspector GEORGE P. BRADLEY, U. S. N., *In charge.*

During the year 1897 there were 330 cases under treatment; of these 54 remained from the previous year.

The average number daily under treatment was 52.17, and the average number of days' treatment was 57.71 per case, as against 42.47 and 55.71, respectively, for 1896.

Among the acute infectious diseases treated at this hospital may be mentioned 7 cases of typhoid fever, 7 of pneumonia, 6 of measles, 15 of mumps, 6 of acute articular rheumatism, and 1 of diphtheria.

Fifty-seven persons were invalided from the service, the principal causes being hernia, 10 cases; rheumatic troubles, 7; phthisis, 5; chronic nervous affections, 6, and venereal diseases, 3.

Five cases were transferred to the Government Hospital for the Insane, the causes being as follows: 2 cases each of mania and melancholia and 1 of paranoia.

The ratio per 1,000 of cases invalided from the service was 172.73, as against 161.29 for 1896.

The death rate per 1,000 of cases under treatment was 27.27, as against 10.75 for 1896.

The 9 deaths were due, 1 each to typhoid fever, acute phthisis, apoplexy, hepatic abscess, stricture of rectum, bronchopneumonitis, chronic nephritis, cerebral syphilis, and alcoholism.

There were under treatment during the year 67 cases of venereal diseases.

NAVAL HOSPITAL, SITKA, ALASKA.

(*Statistics.*)

Passed Assistant Surgeon STEPHEN S. WHITE, U. S. N., *In charge.*

Thirty-two cases were under treatment at this hospital during the year, the daily average of patients being 2.24. The average number of days' treatment per case was 25.50.

Eleven of the 32 admissions were for venereal diseases.

There were no deaths at this hospital and no cases were invalided from the service in 1897.

NAVAL HOSPITAL, YOKOHOMA, JAPAN.

(*Statistics.*)

Surgeon FRANK ANDERSON, U. S. N., *In charge*

There were under treatment during the year 77 cases, of which 5 were continued from the previous year.

The daily average of patients was 10.71, as against 13.72 for 1896.

The average duration of treatment per case was 50.74 days, as opposed to 55.18 in 1896.

There were 5 deaths during the year, the causes being pneumonia, typhoid fever, phthisis, gunshot wound (suicidal), and alcoholism, the ratio per 1,000 of cases treated being 64.94; previous year 21.98.

Twelve cases were invalided from the service, affording a ratio per 1,000 of cases treated of 155.84; previous year 21.98.

FORCE AFLOAT.

(*Statistics.*)

The average strength of the force afloat during the year 1897 was 12,204. The average number of admissions to the sick list per man on the cruising vessels on the North Atlantic Station was 0.75; on those of the Pacific Station, 0.67; those of the South Atlantic Squadron, 0.80; on those of the European Squadron, 0.75; in the Asiatic Squadron, 0.76; on the Northwestern Lakes, 0.24; and on the receiving ships, 0.68. The ratios for the previous year were 0.77, 0.68, 0.86, 0.83, 0.75, 0.41, and 0.72, respectively.

The admissions for general infectious diseases (nonvenereal) were in the ratio of 127.17 per 1,000, as against 128.46 for 1896; diseases of the nervous system, 54.16 (previous year 66.40); diseases of the digestive apparatus, 112.91 (previous year 119.90); diseases of the respiratory apparatus, 51.04 (previous year 60.23), and of venereal diseases and diseases of the genito-urinary apparatus, 98.98, as against 98.44 for 1896.

The deaths numbered 34, which is in the ratio of 2.79 per 1,000, being a slight increase over the deaths afloat for 1896 (2.67 per 1,000).

The number invalided from service was 59, the ratio per 1,000 of force being 4.83, as against 4.21 for the previous year.

There were 1,168 transfers to hospital, giving a ratio of 95.71 per 1,000, as against 81.41 for 1896.

NORTH ATLANTIC STATION.

(*Statistics.*)

There were 31 cruising vessels and a torpedo-boat flotilla employed on the North Atlantic Station in the year 1897.

The mean force corrected for time was 5,516 and the total number of cases admitted to the sick list was 4,150, being in the ratio of 806.74 per 1,000. The ratio for the previous year was 766.17. There were 12 deaths in this squadron during the year, exclusive of those who were transferred to hospital and died subsequently, giving a ratio of 2.17 per 1,000. The deaths were due, 6 to drowning, 3 to wounds, and 1 each to pneumonia, pulmonary consumption, and alcoholism.

During the year there were admitted 268 cases of malarial diseases, 17 cases of pneumonia, 16 cases of typhoid fever, 37 cases of heat prostration, 202 cases of rheumatic affections, 253 cases of bronchial diseases, 16 cases of pulmonary consumption, 116 cases of gonorrhœa, 89 cases of syphilis, and 264 cases of other venereal diseases.

There was no case of cholera, yellow fever, or smallpox during the year.

PACIFIC STATION.

(*Statistics.*)

There were 18 cruising vessels on the Pacific Station in the year 1897. The mean force corrected for time was 2,261, and the total number of admissions to the sick list was 1,510, a ratio of 667.85 per 1,000 of strength. The ratio for the previous year was 676.29.

The number of deaths was 6, exclusive of those who were transferred to hospital and died subsequently, giving a ratio of 2.65 per 1,000. The deaths were due 1 each to cholera morbus, appendicitis, drowning, suicide by hanging, alcoholism, and ingestion of wood alcohol. The principal diseases causing admissions to the sick list were, malarial diseases, 85; rheumatic affections, 87; bronchial affections, 102, and venereal diseases, 178.

SOUTH ATLANTIC STATION.

(*Statistics.*)

Three vessels comprised the South Atlantic Squadron during the year 1897, with a mean force corrected for time of 440. There were 350 admissions to the sick list, giving a ratio of 795.45 per 1,000 of mean strength. The ratio for the previous year was 859.34.

There were 2 deaths on this station during the year, due in one case to the premature discharge of a muzzle-loading cannon, and in the other to acute gastritis, following ingestion of alcohol. The ratio per 1,000 was 4.54 as against 1.93 for 1896.

There were admitted during the year 24 cases of malarial diseases, 29 of rheumatic affections, 18 of bronchial troubles, and 57 cases of venereal diseases, of which number 10 were for gonorrhœa and 14 for syphilis, a marked improvement over the preceding year, when 25 cases of syphilis and 59 cases of gonorrhœa were admitted.

EUROPEAN STATION.

(*Statistics.*)

Five ships constituted the European Squadron during the year 1897, all of which were in commission during the entire year, giving an average complement of 1,402. The total number of admissions to the sick list was 1,048, affording a ratio of 747.50 per 1,000 of strength. The ratio for the previous year was 829.50.

There were 3 deaths on this station during the year, one each from typhoid fever, valvular disease of the heart, and myocarditis. This gives a ratio of 2.14 per 1,000 as against 4.79 for 1896.

There were admitted to the sick list during the year 46 cases of malarial diseases, 83 of rheumatic affections, 21 of heat prostration, 67 of bronchial affections, and 115 of venereal diseases. One case of smallpox occurred on the U. S. S. *Raleigh*, at Beirut.

ASIATIC STATION.

(*Statistics.*)

This squadron was composed of 6 vessels, the mean force of which was 1,296. The number of admissions to the sick list was 988, giving a ratio of 762.34 per 1,000 of strength, as against 751.93 for 1896.

The number of deaths was 4, giving a ratio of 3.08 per 1,000.

The causes of death, exclusive of those transferred to hospital and dying subsequently, were 2 from drowning, and 1 each from typhoid fever and fracture of several ribs with extensive laceration of lung tissue.

During the year there were admitted to the sick list 91 cases of malarial diseases, 39 cases of rheumatic affections, 51 cases of bronchial affections, 10 of heat prostration, and 207 of venereal diseases.

The vessels of this station gave a higher ratio of venereal diseases than prevailed in any other squadron, being approximately 159 per 1,000 of strength as against 129 on the South Atlantic Station, 85 on the North Atlantic Station, 82 on the European Station, and 78 on the Pacific.

There were 2 cases of variola, one occurring on the *Monocacy* and the other on the *Boston.*

The case on the latter vessel was of interest in that it was of marked severity and occurred in a person who had been vaccinated four times within the two preceding years with negative results.

NORTHWESTERN LAKES.

(*Statistics.*)

There was one vessel cruising on the northwestern lakes during the year. The average complement was 98 and the total number of admissions to the sick list 24, affording a ratio of 244.89 per 1,000 of force. The ratio for the previous year was 408.60.

There were no deaths, as was also the case during the previous year.

RECEIVING SHIPS.

(*Statistics.*)

The five receiving ships had a mean complement during the year of 1,191, and the total number of admissions to the sick list was 814, giving a ratio of 683.52 per 1,000. The admission rate per 1,000 of strength was 724.93 for the previous year.

There were 7 deaths, distributed as follows: *Wabash*, 1; *Richmond*, 3; *Independence*, 3.

During the year there were admitted to the sick list 93 cases of malarial diseases, 46 of rheumatic affections, 27 of bronchial affections, and 99 by reason of venereal diseases.

The ratio per 1,000 of venereal cases was 83.12, closely approximating the ratio in the vessels of the North Atlantic Squadron.

NAVY-YARDS, MARINE BARRACKS, AND OTHER SHORE STATIONS.

(*Statistics.*)

The various navy-yards and other shore stations had a mean force during the year of 2,738.

The total number of admissions to the sick list was 2,412, a ratio of 880.94 per 1,000. The ratio for the previous year was 908.82.

The number invalided from the service was 19, giving a ratio per 1,000 of force of 6.93; for previous year, 20.26.

One case of melancholia was transferred to the Government Hospital for the Insane.

There were 17 deaths, the causes being as follows: Injuries, 4; phthisis, 4; pneumonia, 2; chronic nephritis, 2; and 1 each from acute articular rheumatism, apoplexy, heat stroke, chronic hepatitis, and angina pectoris.

The death ratio per 1,000 of force was 6.21, and that per 1,000 of cases treated, 7.05.

Six hundred and thirty-six cases were transferred to hospital, giving a ratio per 1,000 of cases treated of 263.68; for previous year, 148.22.

Of diseases of an epidemic nature there were 194 cases of influenza, 18 of measles, and 5 of mumps.

There were 232 cases of malarial diseases under treatment, as against 307 for 1896.

There were 208 cases of venereal diseases admitted during the year, giving a ratio per 1,000 of force of 75. This rate approximates that for the North Atlantic Station, 85 per 1,000 of force.

SELECTED MEDICAL, SURGICAL, AND SANITARY NOTES FROM SHIPS AND HOSPITALS.

SHIPS.

U. S. S. BENNINGTON.

(*Note.*)

E. P. Stone, *Passed Assistant Surgeon.*

Unusual action of morphia.—The patient sustained a fracture of the right clavicle and contusion of the head on the afternoon of October 5.

He was unconscious at first and remained in a confused mental state until the next day, exhibiting great restlessness and at times slight delirium during the night following the injury, when, owing to great pain, he was given 3 doses of morphine, one-eighth of a grain each. On October 6, by reason of the continued pain and restlessness, it was deemed necessary that he should secure some hours of rest and sleep, and he was given a hypodermic injection of morphine (one-fourth) atropine (one one-hundred-and-fiftieth). The first dose having no apparent effect, the injection was repeated three times at half-hour intervals, but only caused slight drowsiness. As he had taken a grain of morphia the injections were discontinued, although the desired result had not been attained. One hour later, although the slightest noise would awaken him from the light sleep into which he had fallen, it was found that his respirations were only 8 in number; pupils practically unaffected. He was given atropia hypodermically and black coffee by the mouth, and in ten hours the respiratory rate had increased to 14. During this time ordinary conversation would awaken him and he would talk in a clear rational manner. The further progress of the case was uneventful.

Prostatitis.—A private marine contracted gonorrhœa November 13, and was treated by irrigations of permanganate of potassium. The disease ran an uneventful course until December 13, when the discharge had practically disappeared and a cure seemed to have been effected. On December 14 he reported, complaining of severe headache and chills alternating with feverishness during the night. Upon examination there was found slight tenderness of abdomen, most marked at epigastrium, congestion of face and conjunctiva, and a temperature of 101.4°. On December 18 the temperature was 104.8° and all symptoms aggravated. Later on in the day he complained of a sensation of something in the rectum he could not pass, which upon examination proved to be an enlarged tender prostate, the size of an orange. Under treatment of application of wet cups, frequent enemata, etc., the symptoms rapidly ameliorated, so that by December 21 the temperature was normal and all acute symptoms had disappeared.

U. S. S. DETROIT.

(Note.)

VICTOR C. B. MEANS, *Surgeon.*

Oculi ruptio.—The patient, a fireman, was kicked in the face while asleep on deck about 3 o'clock in the morning of December 4. Upon examination a few minutes subsequently there was found enormous œdema of soft parts about left eye, the eyelids so swollen that it was impossible to separate them. The parts were thoroughly cleansed with solution of bichloride and a wound extending along the malar border of the orbit sutured. The swelling had become so reduced as result of treatment that it was possible a few hours later to slightly separate the eyelids, when a whitish fluid escaped and just within the edges could be seen a white body and black fringe. As result of application of boric-acid compresses, the swelling rapidly disappeared, and on December 9 the lens was removed, there being slight adhesions to cornea and conjunctiva. The case progressed favorably, the tendency to formation of adhesions between palpebral and ocular conjunctiva requiring careful attention, and on January 9, 1898, he was discharged to duty with free movement of the stump.

U. S. S. ESSEX.

(Note.)

LEWIS MORRIS, *Passed Assistant Surgeon.*

Conjunctivitis.—During target practice with the new small-caliber rifle four men received injuries to their right eyes from the splitting near the base of the brass cartridge case when fired. The back pressure of the gases generated found its way through the breechblock of the rifle, carrying small fragments of the brass shell and pieces of unignited powder into the men's eyes. Three of those injured were discharged to duty after a few days' treatment; the fourth case, however, was of such severity as to necessitate hospital treatment.

Vulnus laceratum.—An apprentice, while running along the gun deck with bent head, in order to avoid the swinging hammocks, struck against the breech of one of the 4-inch guns, striking his head about 4 inches above the bridge of the nose. The scalp was torn back in a perfectly symmetrical flap with convex margin, the periphery of which measured 10 inches. There was not the slightest symptom of concussion, and the wound healed by first intention.

U. S. S. INDIANA.

(Note.)

N. M. FEREBEE, *Surgeon.*

Pneumonia.—As bearing on the investigations of Netter in connection with otitis media as one of the primary sources of infection in pneumonia, the following case is interesting:

An apprentice, aged 18, was admitted to the sick list on the 22d of March with epidemic catarrh, accompanied by considerable faucial irritation. On the 26th of March the inflammation extended to the middle ears, there being a purulent discharge from the right and a serous one from the left. On April 8 pneumonia involving left lower lobe developed, the temperature in the case ranging from 104° to 104.6°. The case progressed favorably until the 13th of April, when a severe hæmorrhage from the posterior nares occurred. After considerable difficulty the posterior nares were plugged and the bleeding checked. The loss of blood, however, proved so considerable that the patient rapidly sank, and died in a few hours.

Vulnus sclopeticum.—A seaman committed suicide by shooting himself in the head with a .38 caliber pistol. The bullet entered the right side of the skull at the junction of the frontal, temporal (squamous portion), and parietal bones, the external opening being about one-half inch in diameter and the internal one slightly larger. Commencing at the point of entrance was a fracture encircling the frontal bone just above the superciliary ridge and extending through the squamous portion of the left temporal bone into the petrous portion; radiating from this were two smaller fractures extending upward over the frontal bone. The bullet entered the brain at the lower portion of the fissure of Rolando, and made its exit therefrom at the first frontal convolution, one-half inch from the great longitudinal fissure. The brain substance was much disintegrated and the hæmorrhage profuse. The bullet was found flattened out against the inner surface of the left parietal bone.

U. S. S. LANCASTER.

(*Note.*)

A. C. H. Russell, *Surgeon.*

Hysteria.—A machinist was admitted with neurasthenia, resulting from the depressing influences of ship life and hard work undergone in connection with his duties in the engine room while cruising in the tropics. For a year or more he had been dyspeptic and hypochondrical. On the night of October 19 he had an hysterical attack, groaning as if in great pain. When examined nothing was discovered to justify the noise he was making, and the patient stated that he was free from pain. Tongue coated, breath foul, constipated. Temperature and pulse rate normal. The night of October 20 he made a great outcry; howled and groaned apparently for no other reason than to attract attention and sympathy. Threats of cauterization quieted him. The night of the 21st had another hysterical outburst; the following day he was quiet, and said he could not tell why he howled during the night. Had no hallucinations. The patient was transferred November 22 to the naval hospital, Chelsea, Mass., where attacks, similar to those described above, occurred rather frequently, but ceased under antispasmodic treatment. His subsequent history was that early in December he exhibited evidences of dementia, such as inability to concentrate attention, uncertainty of purpose, and some delusions. His mental state rapidly became more serious, a destructive tendency developing, it being necessary to keep constant watch over him. He was surveyed on December 14, and from evidence furnished by the records on file in the Bureau of Medicine and Surgery the mental condition was considered to have resulted from an attack of constitutional syphilis for which he was treated in 1881 and subsequently. The patient was transferred to the Government Hospital for the Insane December 22, 1897.

U. S. S. MARBLEHEAD.

(Note.)

A. R. WENTWORTH, *Passed Assistant Surgeon.*

Hæmaturia.—An apprentice was admitted to the sick list June 22 complaining of severe pain over the kidneys, especially on left side, and stating that he was passing bloody urine, a specimen of which upon examination showed 15 per cent of albumen. Although patient denied having taken any irritant drug, the testimony of several persons showed that he was treating himself for stricture with medicine obtained ashore. After six days' treatment the urine became perfectly clear and the amount of albumen reduced to 1 per cent. He was discharged July 7 to the naval hospital at Chelsea, where he was under treatment for cystitis and pyelitis of left kidney. His condition improved while in hospital, and he was discharged from the service November 8, at which time there remained pain in left hypochondrium.

U. S. S. MONADNOCK.

(Note.)

JOHN M. STEELE, *Surgeon.*

Angio-neurotic œdema.—A landsman, 24 years of age, was admitted to the list March 19, with conjunctivitis of left eye, and œdema of lower lids of both eyes, together with marked swelling of both ankles. There was swelling of the dorsal aspect of the hands associated with sharply defined purpuric spots and urticaria, which latter was present on back and arms as well. Urinary analysis negative. The patient gave a history of having been engaged in mining for five years prior to entering the naval service, his duties being connected with blasting, which was carried on at a depth of about 800 feet. He stated that during this period he was constantly anticipative of injury. The œdema rapidly disappeared without any treatment other than an alkaline lotion for the itching incident to the uticaria.

U. S. S. OLYMPIA.

(Note.)

A. F. PRICE, *Medical Inspector.*

Febris enterica.—An ordinary seaman was admitted to the sick list on the 14th of November, supposed to be suffering from the hæmorrhagic form of pernicious malarial fever, there being present in addition to the febrile symptoms, hæmatemesis, bloody stools and urine. On the 17th hemorrhages occurred from the nose and mouth in addition to those noted above, the patient being transferred to the civil hospital at Nagasaki. On the 18th the hemorrhages became less profuse, except that from the bladder, which continued as before. The patient died on the 20th of November. The post-mortem examination showed the mucous membrane of the ileum to be intensely congested with ulceration of Peyer's patches.

U. S. S. OREGON.

(Note.)

P. A. LOVERING, *Surgeon.*

Fractura.—On April 19, while at work in the dry dock, a seaman was struck on the right side of the face by a large block of wood, driving in the floor of the orbit and lacerating the soft tissues above and below the eye. The fracture was impacted, there being a depression in the floor of the orbit sufficiently large to admit the end of the thumb, the rough edges of bone being readily felt. The eye fortunately escaped injury. The wounds healed without suppuration and the resulting deformity proved slight.

Vulnus sclopeticum.—While at his station, during target practice, a seaman was struck in the left eye by a fragment of an electric primer, which pierced the sclerotic and embedded itself in the deeper tissues of the eye. There was considerable hæmorrhage under the conjunctiva and into the interior of the eye. Vision was immediately lost, only a faint perception of light remaining. The eye was subsequently enucleated.

U. S. S. PHILADELPHIA.

(Note.)

JOHN C. WISE, *Medical Inspector.*

Wood alcohol poisoning.—A seaman after having indulged in a milk punch composed of condensed milk, eggs, sugar, water and wood alcohol stolen from the alcohol tank on the poop, was found to be intoxicated and placed under the sentry's charge. The following morning (April 7) he was released, but during the day having again obtained some of the same mixture he had taken on the previous day, which was estimated to contain about 20 per cent of wood alcohol, he was toward night again confined. At an early hour on the morning of April 8 the patient was seized with vomiting, uræmic symptoms suddenly developed about 10 a. m., the urine being loaded with albumen. Death ensued at 11 o'clock a. m.

Asphyxia.—Two cases were admitted on September 7 as the result of a chute leading to a coal bunker becoming choked. The first man when taken out was in an unconscious state, but on being placed in fresh air made a rapid and complete recovery. The second case, however, after being taken out began to have convulsions almost immediately, these taking the form of struggles to extricate himself from the bunkers. Becoming more violent, it was found necessary to administer chloroform, which was followed by venesection, 12 ounces of blood being drawn off. After this he became conscious. When awake his condition was normal, but when asleep, expiratory spasms would develop, which extending, soon involved the entire voluntary muscular system. Sudden noises would bring on expiratory spasm, followed by general convulsions. This condition kept up for three weeks, when the convulsions had practically disappeared. He was afterwards transferred to the naval hospital at Mare Island, and was finally discharged to duty January 24, 1898.

U. S. S. RALEIGH.

(*Note.*)

E. H. MARSTELLER, *Surgeon.*

Ptomaine poisoning.—While at Gibraltar, a private marine who had partaken largely of Spanish mackerel for his supper, shortly afterwards began to experience nausea, vertigo, and intense headache. When first seen he was doubled up with violent pains in epigastrium—injected conjunctivæ and suffused face. The pulse was weak and irregular, numbering 140 beats. The skin was mottled with purpuric blotches and profuse perspiration covered the entire body. He also complained of a sensation of a ball rising in his throat and of great faucial dryness. Several other men who had partaken of the fish were also made ill; the symptoms being similar to those of the man first attacked. In all these cases marked relaxation of the peripheral vessels was the symptom first noted, preceding the vomiting in all the cases.

U. S. S. RICHMOND.

(*Note.*)

W. F. ARNOLD, *Passed Assistant Surgeon.*

Malaria.—In several cases of intermittent fever developed on board the *Richmond* the diagnosis was confirmed microscopically in almost all of the cases. An unconfirmed case was interesting in that it developed just twenty-one days after his arrival at League Island. As this period is exactly that at which relapses occur in tertian affections, this will undoubtedly be established as the period of incubation of the tertian organism. There is no evidence that any other form of the malarial parasites than the tertian exists at this station.

U. S. S. SAN FRANCISCO.

(*Note.*)

C. U. GRAVATT, *Medical Inspector.*

Glaucoma.—A Japanese mess attendant was admitted to the sick list on June 23, complaining of marked pain of right eye, also tenderness and swelling of tissues below right orbit. The tension of the affected eye was found to be notably increased. On June 30 condition was decidedly more serious; marked œdema of conjunctiva, increased swelling of infra-orbital region, loss of sensation in areas supplied by superior maxillary nerve, and great pain in right temporal and parietal regions. It was suspected that these symptoms were due to a tumor, but after removing the eye on August 13, it was impossible to find any evidence of tumor about orbit. The patient was transferred to the naval hospital, New York, in the latter part of September. As there was little improvement in condition, an operation was performed on January 9, 1898, removing necrosed portion of superior maxilla. Subsequently there remained a large suppurating cavity discharging into roof of mouth. On July 11 patient was found in an unconscious state. Death ensued the following morning. The autopsy revealed a hard cancerous growth, involving superior maxilla, orbit, dura mater, and right middle lobe of brain.

U. S. S. VESUVIUS.

(*Note.*)

JAMES F. LEYS, *Passed Assistant Surgeon.*

Dermoid cyst simulating fistula in ano.—A boiler maker, 22 years of age, was admitted on November 22 with what was supposed to be a fistula in ano. He gave a history of having received a severe contusion of median edge of left buttock as result of a fall in November, 1896. Later on an incision was made, which had remained open almost continuously, from which there was a thin purulent discharge, which condition, however, did not interfere with his duties. After his transfer to this ship he reported at sick call, and the same day (November 22), after careful probing, it was determined that disease was confined to the fleshy part of the buttock. An incision 2½ inches long was then made and the sinus found to terminate in a small dermoid cyst, 1 inch in diameter and lying half an inch beneath the skin and 2 inches from the anus. It was filled with a growth of stiff, thick hair. The cyst had apparently been ruptured by the injury received in November, 1896. After curetting the cavity it was packed and allowed to heal by granulation, which took place promptly and completely.

U. S. S. YANTIC.

(*Note.*)

GEORGE B. WILSON, *Passed Assistant Surgeon.*

Vulnus sclopeticum.—While engaged at target practice on March 8 the charge of powder in a IX-inch S.B. gun prematurely exploded, resulting in two casualties.

(1.) A coxswain, leaning over the muzzle of the gun at the time of the accident, and thereby exposed to the full force of the blast, was carried through the gun port and overboard, all efforts to find the body proving unavailing. An examination of the main chains adjacent to the open port showed traces of blood, hair, and small fragments of bone.

(2.) A seaman who was ramming home the charge of powder at the time of the explosion had both bones of right forearm fractured at lower third. At first it was thought that the circulation was not interfered with, but after recovering from shock the rapid swelling and discoloration of tissues, with absence of radial pulse, showed that vessel to have been ruptured. After consultation it was decided that amputation was necessary, which operation was performed at middle third. The wound healed satisfactorily except for slight sloughing of contused tissue necessarily included in the flap. The patient was subsequently discharged from the service with a good stump.

HOSPITALS.

NAVAL HOSPITAL, PORTSMOUTH, N. H.

(*Note.*)

J. B. PARKER, *Medical Inspector.*

Amputation left thigh (*upper third*).—On August 15 an acting coxswain on board the *Puritan*, while assisting in getting up anchor, had his left leg and thigh wedged between the bow of the ship and the anchor chain. After considerable difficulty he was extricated and upon examination the bones of the extremity were found to be intact, as was likewise the case with the integument. Upon admission to hospital it was evident, from the coldness, anæsthesia, and lack of circulation in leg and foot, that serious injury to the larger vessels had resulted. In the hope that collateral circulation would be established and that part, at least, of the limb might be saved, heat was applied to the injured extremity. All efforts, however, proved unavailing, acute gangrene setting in on the seventh day, extending rapidly upward, so that by the 27th day of the month it had reached as high as the knee. No line of demarcation appearing and the condition of the patient becoming most serious (temperature 104.8°, pulse 115), it was decided to amputate. The operation was performed under rigid aseptic conditions at the upper third, the tissues under the sound integument lower down being completely disorganized. The wound healed practically by first intention, and he was subsequently supplied with an artificial limb.

NAVAL HOSPITAL, CHELSEA.

(*Note.*)

J. H. CLARK, *Medical Director.*

Ulcerative endocarditis.—A coal passer, 24 years of age, was admitted to the hospital on the 18th of October with a diagnosis of typhoid fever. On admission the patient presented the following symptoms: Pallor; furred, moist, tremulous tongue; frequent fluid, light yellow, highly offensive evacuations; cough, pain referred to upper part of right chest; only moderate sense of weakness; there was absence of abdominal tenderness and mental hebetude. While in hospital the temperature was very irregular, being at times practically normal morning and evening, and again ranging from 100° to 104.6° during the day. The sweating was noted on certain days as drenching; on other days as only moderate. Three days after admission systolic and diastolic murmurs were detected, there being at the same time violent heart action and bounding pulse. There were frequent rigors. Widal's agglutination test was made twice during the last days with negative results. On the 5th of November, while talking with one of the attendants, he died almost immediately. The post-mortem examination failed to reveal any lesions of the ileum. The pericardium was filled with fluid blood and 6 ounces of soft, fresh clot. One aortic valve was covered with coarse granulations pendent into left ventricle. There was found ulcerative change just below aortic valve which led to perforation from left ventricle into left auricle and opening into pericardium.

NAVAL HOSPITAL, NEWPORT, R. I.

(*Note.*)

C. A. SIEGFRIED, *Surgeon.*

Scarlet fever.—An epidemic of this disease prevailed at the training station during the third and fourth quarters—there being 21 cases with 2 deaths. The two following cases were of special interest:

(1) An apprentice, aged 16 years, was admitted October 15, 1897, with a general and intense scarlatinal rash, marked anginose symptoms and temperature of 104°. The patient was greatly prostrated. The throat symptoms continued prominent, associated with high temperature, vomiting and delirium until the 18th, when the temperature began to fall accompanied by clammy sweats and carphologia—death taking place at 11.30 p. m. The case greatly resembled diphtheria except for the persistent rash becoming petechial before death.

(2) A boy, 14 years of age, was sent to hospital September 21, as with catarrhus bronchialis, there being not the slightest manifestation of a scarlatinal rash; on the 6th of October active desquamation set in and the diagnosis was changed to scarlet fever. The case was marked by severe and persistent frontal headaches, projectile vomiting, continued fever, and obstinate constipation. On the 10th the temperature was 104°, intense headache with constant moaning, dilated pupils, and intolerance of light. The presence of a quickened pulse rate was the only atypical factor in a diagnosis of meningitis of a serious character and limited to the base of the brain. There was loss of power of arms and legs. Mental processes clear. The patient began to improve on the 25th, there being at times marked unilateral flushing and rise of temperature, with extreme hyperæsthesia of skin; a slow and tedious convalescence followed, the case being discharged to duty on the 29th of November.

NAVAL HOSPITAL, BROOKLYN, N. Y.

(*Note.*)

GEORGE W. WOODS, *Medical Director.*

Cerebral syphilis.—An enlisted man, 33 years of age, was transferred to this hospital on April 28, with *chancroides.* There was a distinct history of syphilis contracted in February, 1896, followed by eruption and other secondary symptoms. When he arrived at the hospital there was found a large sore on the frænum, which, under specific treatment, finally healed on the 8th of June, marked induration remaining at site of lesion. Early in June the patient began to complain of severe headaches, at times associated with vertigo and muscular weakness. On June 28 there was partial paralysis of right arm and leg, which was followed on the 7th of July by complete paralysis of arm and leg of left side, with slight involvement of muscles of pharynx and tongue of same side. The paralysis of left side of face became more pronounced. Patient became comatose, death ensuing on the 10th of July, 1897. *Necropsy.*—Both lungs congested, especially the left; small vegetation on tricuspid valve and excess of pericardial fluid; liver, spleen, kidneys, and intestines normal; meninges of brain congested, with a small blood clot over the motor area of right cortex; the right lateral sinus was the seat of a thrombus, the cause of the marked venous congestion noted in the entire brain substance.

Floating cartilage—knee-joint operation.—The cartilage was removed through an incision into the joint. The wound of the skin and that of the capsule of the joint were closed by separate sutures. The advantage of this method was shown by the fact that although suppuration occurred in the wound of the skin, the joint did not become infected. The patient made a perfect recovery and was sent to duty.

Empyema—operation.—An apprentice, 18 years of age, was admitted with empyema, due apparently to periostitis and necrosis of ninth rib of left side. About 8 inches of necrosed rib was excised and the pleural cavity relieved of a large amount of pus. Six months later the cavity and discharge persisting, sections from 2½ to 4 inches in length, with the underlying soft parts were removed from the fifth, sixth, seventh, and eighth ribs. (Schule's modification of Eitlander's operation.) The wound healed by granulation, obliterating the cavity. The patient was discharged to duty in good health, very little deformity having resulted, and with a firm chest wall. There was no sign of tuberculosis during the progress of the case.

NAVAL HOSPITAL, PHILADELPHIA, PA.

(*N*

George H. Cooke, *Medical Director.*

Fractura—base of skull.—A beneficiary was brought into the hospital at 2.30 p. m., March 9, 1897, with a history of having been found unconscious in a street near by. On admission left ear was found full of dark blood, which was slowly oozing out and running down the cheek. Patient became semiconscious about ten minutes after being placed in bed, telling his name upon inquiry. No apparent contraction or paralysis. At 3 p. m. he rapidly passed into a state of profound coma, respirations becoming stertorous and slow. Blood still continued to flow from left ear, and about 4 o'clock he began to spit up clotted blood, which continued at intervals until he died at 8.55 p. m. *Necropsy.*—Upon reflexing the scalp from the left mastoid and occipital regions the parts were found infiltrated with semifluid blood. On cleaning this away there was plainly visible a fracture of the mastoid process of the temporal bone, extending to about the middle line of the base of the skull. After taking off the skull cap and removing the dura mater the entire surface of the left hemisphere was seen to be covered by a semifluid blood clot. The brain upon removal showed nothing abnormal. The handle of a scalpel was then introduced into the external fracture, and upon making gentle prying movements the lines of fracture were traced backward along the occipital, forward across the middle fossa through the petrous portion of temporal bone, and through the greater wing of the sphenoid almost to the foramen ovale. The peculiar interest attached to this case consists in the fact that this man was brought to the hospital on December 8, 1896, in practically the same condition as on the admission of March 9, 1897—bleeding from the left ear, swelling appearing after a few hours at left mastoid and occipital region, together with violent pains in head and inability to lie with occipital region on pillow—the only difference being absence of the comatose condition;

there was, however, mental confusion lasting several weeks. He was allowed to return to the Naval Home on January 4, 1897, although it was noted on the case paper that his memory remained impaired. The second admission and the post-mortem finding suggest the probability of a fracture having existed at the time of the first admission, but without sufficient displacement to cause the serious consequences of the second injury.

Bronchial irritation.—An oiler, 37 years of age, of powerful physique, was admitted to the hospital on the 1st of May with a history of an acute pain in the upper lobe of the left lung, which came on suddenly on the 19th of April; the pain continued, with a dry cough, during the six days following, when on April 25 he was admitted to the sick list of the ship to which he was attached. On admission to hospital his temperature was 101°. Upon auscultation nothing abnormal was discovered except at the painful spot, where fine rales were heard. He began on May 2 to expectorate small quantities of blood-streaked sputum, which became purulent and very fetid four days later. Profuse sweats, irregular temperature, ranging from 100° to 104°, and general hectic condition were prominent features of the case, until, finally, on May 14, during a violent fit of coughing, the patient expelled a concretion, covered with muco-purulent matter, which, upon examination, was found to be made up of very sharp, spicular, and jagged plates of phosphate of lime, and when dried weighed 6 grains. The fever subsided, the fetid sputum ceased, and rapid, almost immediate, recovery took place. He was discharged from the hospital on June 3 entirely well.

NAVAL HOSPITAL, WASHINGTON, D. C.

(*Note.*)

George A. Bright, *Medical Inspector.*

Mastoiditis.—A coppersmith, 39 years of age, was admitted to the hospital on the 13th of April from the naval hospital, Norfolk, Va., with the following history: During August, 1896, while attached to a cruising ship, after exposure to marked and sudden changes of temperature, otitis media (left side) developed, which was relieved by incision of tympanic membrane. In the latter part of September this condition again developed, associated with extension of inflammatory process to mastoid cells. He was received into the naval hospital, Norfolk, on the 8th of October, and two days afterwards a long incision was made behind the left ear, over the mastoid process, which resulted in the evacuation of a large amount of pus. Relief followed the operation and it seemed that a cure would result. The improvement, however, was only temporary, and on October 30 the sinus, which had remained at the inferior angle of the wound, was laid open, extending the incision downward, subsequently packing with iodoform gauze. The pain and other acute symptoms subsided after this operation, becoming aggravated however at intervals, so that on January 18, 1897, it was decided to open up the cavity of the mastoid antrum, which was effected with a chisel, and after cleaning out the affected cells the wound was packed with gauze. As it became apparent during the weeks succeeding that the operation performed in January had not been sufficiently radical, on the 7th of March the mastoid process was again exposed and former opening enlarged, again curetting. Patient was transferred to the naval hospital, Washington, D. C., on the 12th of April, and upon admission was found to have a sinus in the mastoid process, from which, upon entering a probe to the depth of 1 inch, a thick creamy pus was discharged; there was considerable irritation of the facial nerve but no urgent symptoms. Early in July his condition became serious and on the 7th of the month a fourth operation was performed. An incision was made from the temporal region over the mastoid process, the bone being laid bare and a one-fourth inch trephine entered over the antrum of the bone. Upon reaching the air cells the trephine was withdrawn and communication completed with a drill. A trench was then cut extending from the opening to the tip of the bone, and after thoroughly curetting, the wound was packed. The hæmorrhage during the operation was most profuse and proved very embarrassing. The symptoms were relieved almost immediately and the patient was discharged from hospital on September 7 entirely well.

Varicocele (*two cases*).—A private in the United States Marine Corps was admitted to the hospital on May 5 for operation on account of a very large left varicocele which, by reason of pain and great discomfort, incapacitated him. Five days subsequently, under æther anæsthesia, an incision was made from above the external ring extending down along the spermatic cord. The veins were separated and ligated in two places a little more than an inch apart, the veins then divided near the ligatures, the intervening portions removed, and the cut ends brought together. The result was most satisfactory.

On July 8 an apprentice was admitted for operation, this being necessitated more from the mental worry than from physical discomfort. The operative procedure in this case was similar to that in the former patient, and on the 24th of July, an excellent result having been obtained, he was discharged to duty.

Fractura.—An officer, 56 years of age, as a result of a fall of 25 feet, sustained a fracture of the right femur. He was unconscious for 12 hours after receiving the injury. Patient had regained consciousness upon admission to hospital April 4. About 18 hours subsequent to the accident an anæsthetic was administered and upon examination there was found to exist a comminuted fracture of right femur, partly intra and partly extra capsular. In addition there were severe contusions of right hip, buttocks, and side of chest, both wrists and right ankle severely sprained, considerable hæmorrhage from rectum but apparently no fracture of pelvic bones; the superficial veins in both lower extremities had been ruptured, the extravasated blood assuming a peculiar arborescent appearance. The fracture was put up in Buck's apparatus with sand bags. On May 18 this was removed and the position of the limb found to be most satisfactory, there being after careful measurement absolutely no shortening. The patient went on leave on July 5, at which time he was able to walk about with aid of a cane. He returned to hospital on the 2d of August and reported himself as ready for duty. He can walk up and down stairs without any kind of support, advancing his feet alternately. He is able to flex the knee well beyond a right angle. Absolutely no shortening, although he walks with a perceptible limp. Much improvement in this respect is to be expected.

NAVAL HOSPITAL, NORFOLK, VA.

(*Note.*)

C. J. CLEBORNE, *Medical Director.*

Appendicitis.—The patient, a mess attendant, 22 years of age, was admitted to hospital on August 4 with history of abdominal pain which had become marked over McBurney's point the preceding day. Upon examination he was found to have a temperature of 102.8° F.; pulse rate, 100. There was tenderness of right iliac region and marked tenderness of right lumbar region. It was impossible to define a tumor by reason of rigidity of the abdominal muscles of right side; there was dullness, however, extending almost to the linea alba. For two days his condition remained unchanged, but on August 7 a frequent pulse, with great restlessness, led to operative interference. An incision parallel to and above Poupart's ligament was made and upon reaching the abscess and making an opening through the abscess wall a large amount of fæcal pus containing necrotic shreds was evacuated. The abscess cavity was thoroughly irrigated and gauze drainage employed. The wound was then closed, the peritoneum and muscles with a continuous suture, and the skin by the interrupted method. Patient never thoroughly rallied from the operation; pulse went up to 140 and temperature remained elevated; a change of dressings showed wound in good condition with perfect drainage. He died on the fourth day after the operation. The necropsy revealed in the right side of pelvis about 3 ounces of exceedingly fetid pus localized by coils of intestines. Vessels of peritoneum injected and intestines adherent by recent adhesions. Appendix found behind colon, only about 1 inch remaining, the other portion having sloughed off. The colon, where it formed the anterior wall of the abscess, was found to be of a dark color and very friable. There was absence of any concretion in appendix, the lumen of which was narrowed.

Abscessus cerebelli.—A private (marine) was admitted to the hospital, August 26, with a history of having had measles in April, which was attended with otitis of both sides; he was discharged to duty, however, apparently well, June 16, 1897. Subsequently he suffered occasionally from severe headaches and at times from return of the ear trouble. Upon examination in hospital the following notes were recorded: Face flushed; pupils dilated; temperature 98°; pulse 66; general headache, uninfluenced by pressure or tapping over any particular area; skin over mastoid processes somewhat œdematous; no discharge from the ears. For the succeeding four days the pulse was slow, 56 to 64, with a subnormal temperature and frequent vomiting. On the 30th patient became comatose with Cheyne-Stokes breathing. His decubitus was on one or the other side with knees and arms drawn up and head off the pillow. After the fifth day the temperature began to go up, ranging from 99° to 104.8°; with the rise of temperature the pulse rate became accelerated (80 to 160), urine and fœces passed involuntarily; patient more or less in a stupor.

On September 5 it was found impossible to produce any reaction from irritation, the pupils likewise failing to respond to light. Death occurred at 2.30 o'clock on the morning of September 6. *Necropsy.*—Upon opening up the mastoid cells a small amount of pus was found on right side; left side empty. The calvarium was then removed and the brain taken out, when it was found that the right half of the cerebellum had been transformed into a large pus cavity containing about 2 ounces of pus. When the tentorium cerebelli was cut on right side about one-half an ounce of greenish pus escaped from the occipital fossa. The petrous portion of the temporal bone of affected side was decidedly hyperæmic, eroded, and felt rough to the fingers.

Carcinoma ventriculi.—A cabin cook, aged 53 years, was admitted to hospital October 27, with a history of dyspepsia extending over a period of three years without impairment of health until within the past two months, when he began to experience more or less constant pain in epigastric region, associated with vomiting after eating. There was progressive loss of weight and strength. No history of hæmatemesis. Upon examination a tumor in right side of epigastrium was found. Test for free H Cl showed absence thereof. The condition of the patient rapidly became grave, coffee-ground vomit appearing on November 12 for the first time. Death occurred the following day. Necropsy revealed normal condition of thoracic viscera. On opening the abdominal cavity the stomach was found to be very much distended, reaching below the umbilicus. The abdominal viscera were then removed en masse, and afterwards dissected away from the tumor, which was found to involve the head of the pancreas and the pyloric end of the stomach. The stomach was found to be filled with a brownish fluid containing large hard masses of casein. It was impossible to pass the little finger through the pyloric lumen. The cancerous growth involving the head of the pancreas formed an inseparable mass with that of the pylorus.

NAVAL HOSPITAL, MARE ISLAND, CAL.

GEORGE P. BRADLEY; *Medical Inspector.*

Abscess of the liver.—A chief boatswain's mate, 34 years of age, was admitted on August 27 with a diagnosis of cholelithiasis. The history of the case was that during a period of service in the Navy of thirteen years, largely spent in tropical climates, he had suffered frequently from attacks of hepatic colic, which had in recent years become more severe. The patient had recovered from the attack for which he was sent to hospital by August 29, but on September 8 a second seizure supervened, from which he soon recovered. An examination at this time showed the liver dullness to extend to the fifth interspace in the mid-axillary line. The man's condition improved during the month of October as to symptoms referred to the liver. Early in November he began to complain of pain in right hypochondrium radiating to right shoulder, together with weakness and profuse sweating, these symptoms leading to a diagnosis of hepatic abscess, which was confirmed by an exploratory puncture, about 12 ounces of pus being withdrawn. On December 3, an incision 4 inches long, parallel to the lower border of the ribs, was made down to the liver and packed with gauze. Five days subsequently, adhesions having been established, the abscess was incised and pus evacuated. On the 14th a second incision was made and about 1 quart of pus discharged. The pus continued to discharge freely, but the patient steadily failed, death from exhaustion taking place on February 20, 1897. The necropsy disclosed the abscess cavity which had been incised to be healing. In addition to this one, a second large perihepatic cavity was found on the anterior and external surface of the liver. There was cirrhosis of kidneys and liver.

Skiagraph in removal of bullet.—A seaman was admitted on the 6th of April, having been shot in the back with a .38 caliber pistol ball. The wound of entrance was just below inferior angle of left scapula, the course of the bullet being transversely across back, lodging in the tissues near the apex of the right scapula. Owing to the obesity of the man and the deep location of the bullet, it was impossible to locate it definitely by ordinary means. A skiagraph was then taken, which showed the ball to be about 3 inches internal to the location indicated by manipulation. The patient was anæsthetized and the bullet removed. It was found about 3 inches from the surface, beneath the trapezius and below the lower border of the rhomboideus major. Owing to the large size of the man, an exposure to the X-rays for forty minutes was necessary, notwithstanding which there was no dermatitis or other bad effect observed. The wound healed readily, and the patient was discharged to duty in about two weeks.

Popliteal aneurism.—An ordinary seaman, 36 years of age, was admitted May 13 with a large and painful saccular aneurism of lower half of right popliteal artery. The methods of treatment at first instituted (forced flection for two weeks, and later on compression and dietary measures) proving inadequate, and the rapid increase in the size of the tumor, associated with pain described by patient as "tearing," producing marked exhaustion, it was decided to perform the operation of deligation of the femoral artery. The ligature was applied at the apex of Scarpa's triangle. Recovery from the operation excellent, and without shock. Pulsation in the tumor ceased at once, and the size of the solidified mass steadily decreased, a permanent cure being effected. In February, 1898, the patient began to complain of pain located in "pit of stomach," and later on, upon examination, a distinct bruit with marked pulsation was discovered behind and to left of ensiform cartilage. On June 27 the man was found dead. The autopsy revealed a ruptured aneurismal sac the size of a hen's egg at the junction of the superior mesenteric artery with the aorta.

Cerebral syphilis.—The patient, a seaman, was admitted to the hospital with a diagnosis of epilepsy. There was a history of syphilis contracted in March, 1895, while serving on the U. S. S. *New York*. The primary sore was followed by secondary eruption and general glandular enlargement.

He was transferred in May of the same year to the United States Naval Hospital, New York, and while there under treatment had severe iritis, involving the right and left eye alternately. He was discharged to duty, apparently free from active manifestations of the disease, on October 28, 1895. During the month of March, 1897, the patient was treated on board the *Petrel* for syphilitic cachexia and afterwards in this hospital, at which time the most prominent symptom was the existence of extremely painful nodes of frontal and occipital bones. These gradually disappeared under treatment and he was discharged to duty May 20, 1897. The admission for epilepsy, May 31, 1897, from the U. S. S. *Concord*, was recorded as of syphilitic origin, and, in addition to frequent convulsive seizures, epileptiform in character, there were periods of delirium, alternating with a semicomatose state. Clonic spasms of left side of face, left arm and hand, and left leg occurred at frequent intervals. During the latter part of October his condition improved, delirium occurring only at night, the patient being rational during the day. About the 1st of November he began to fail rapidly, ophthalmoscopic examination showing choked disc and retinal atrophy. Death occurred on the 30th of December, a condition of coma having existed for ten days previously. The examination of the brain revealed a gummatous tumor, about an inch and a quarter in diameter, situated at the upper end of the fissure of Rolando of right side, and adherent to the dura. The roof of the fourth ventricle was softened. Gummata were also found in the liver, and the mesenteric glands showed general enlargement.

NAVAL HOSPITAL, YOKOHAMA, JAPAN.

(*Note.*)

Frank Anderson, Surgeon.

Vulnus sclopeticum.—A private marine detailed as one of the marine guard at the hospital, after absenting himself without leave for several days, shot himself with suicidal intent shortly after returning to his quarters, August 6. Examination soon after infliction of the wound showed that he had shot himself with a .45-calibre revolver, the ball entering just above the right clavicle, between the anterior border of the trapezius and posterior border of the sterno-mastoid muscles. Skin about wound was blackened. Hæmorrhage quite free for about 5 minutes, when it suddenly ceased. There was no wound of exit nor external evidence of location of bullet. There was total loss of voluntary motion and sensation below a horizontal line through the nipples; all reflexes below this line abolished. On the trunk, anæsthesia extended laterally as high as the axillæ but in front only to the nipples. In the upper extremities, sensation was much impaired in the hands and forearms but improved in ascending, being normal over the biceps but much impaired over deltoid; motion of flexors decidedly affected, but of extensors unimpaired. There was fibrillary twitching of masseter, sterno-mastoid, and arm muscles. All the above symptoms were symmetrical. Bladder paralyzed. Respiration purely diaphragmatic. Three attempts to locate the bullet with X-rays failed. On August 7 tympanites became most pronounced, interfering with respiration. On the 9th dyspnœa increased to such an extent that it was necessary to puncture transverse colon with aspirating needle. Death from asphyxia occurred the following day. At the autopsy, the upper portion of spinal column was removed and a longitudinal section made with saw; and lying entirely within that part of the spinal canal formed by the first dorsal vertebra was found the bullet, entirely occupying the canal. Traced from within, the entrance of the bullet was found to have been between the right pedicles of the sixth and seventh cervical vertebræ, from which point it had descended along the canal. The spinal cord was completely destroyed for about three-fourths of an inch.

STATISTICAL TABLES.

The following statistical tables give in detail the data on which the statements of this report are based.

I. General view of the effects of disease and injury on the Navy and Marine Corps during the year 1897.

II. *North Atlantic Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1897.

III. *Pacific Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1897.

IV. *Great Lakes Station.*—Name of ship, average complement, admissions for disease and injury, sick days, daily average of patients, discharges from the service for the year 1897.

V. *South Atlantic Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1897.

VI. *European Station.*—Names of ships, average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1897.

VII. *Asiatic Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1897.

VIII. *Receiving ships.*—Names of ships, average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1897.

IX. *Navy-yards, Marine barracks, and other shore stations.*—Names, average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospitals, discharges from the service, and deaths during the year 1897.

X. *Force afloat.*—General aggregate, 1897.

XI. *Force afloat.*—Detailed statement, 1897.

XII. *Navy-yards and other shore stations.*—General aggregate, 1897.

XIII. *Navy-yards and other shore stations.*—Detailed statement, 1897.

XIV. *Naval hospitals.*—General aggregate, 1897.

XV. *Naval hospitals.*—Detailed statement, 1897.

XVI. *Report of vaccination.*—1897.

XVII. *Prevalence of special diseases (relation by scale).*—1897.

XVIII. *Mortuary record.*—1897.

XIX. *Deaths in the Navy and Marine Corps during the year 1897, (relation by scale).*

TABLE I.—*General view of the effects of disease and injury on the Navy and Marine Corps during the year 1897.*

Average strength of the Navy and Marine Corps [a]	15,734
Average strength shown by reports of medical department [b]	15,229
Average strength of the force afloat	12,204
Admissions for disease ashore and afloat	9,053
Ratio per 1,000 of strength	594.46
Ratio for previous year	628.42
Ratio for two preceding years	649.87
Admissions for injury ashore and afloat	2,342
Ratio per 1,000 of strength	153.79
Ratio for previous year	149.33
Ratio for two preceding years	157
Total admissions to sick list during the year	11,395
Ratio per 1,000 of strength	748.24
Ratio for previous year	777.75
Ratio for two preceding years	806.88
Daily average of patients	454.08
Ratio per 1,000 of strength	29.82
Ratio for previous year	29.71
Ratio for two preceding years	31.90
Total number of sick days	165,741
Average for each man of Navy and Marine Corps	10.88
Average for previous year	10.87
Average for two preceding years	11.69
Average days each case was treated	14.55
Average for previous year	13.98
Average for two preceding years	14.45
Discharges from service for disease	281
Ratio per 1,000 of strength	17.86
Ratio for previous year	14.65
Ratio for two preceding years	14.02
Discharges from service for injury	47
Ratio per 1,000 of strength	2.99
Ratio for previous year	2.54
Ratio for two preceding years	2.41
Total discharges for disability	328
Ratio per 1,000 of strength	20.85
Ratio for previous year	17.19
Ratio for two preceding years	16.43
Deaths from disease	56
Ratio per 1,000 of strength	3.56
Ratio for previous year	4.51
Ratio for two preceding years	4.89
Deaths from injury (including poison)	32
Ratio per 1,000 of strength	2.03
Ratio for previous year	.98
Ratio for two preceding years	1.24
Total deaths from all causes	88
Ratio per 1,000 of strength	5.59
Ratio for previous year	5.49
Ratio for two preceding years	6.14

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[a] Used in computing ratios of deaths and discharges from service for disability.

[b] Used in computing all ratios except those of deaths and discharges from service for disability.

TABLE II.—*North Atlantic Station.—Average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship, for the year 1897.*

Names of ships.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Alliance	Year	197	94	22	116	588.83	1,148	3.15	15.99	10	1	....
Amphitrite	Year	110	35	22	57	518.18	440	1.21	11.00	10	....	....
Annapolis *a*	165 days	61	25	14	39	639.34	378	2.29	16.22	5	....	....
Bache	Year	45	14	4	18	400.00	162	.44	9.78	....	....	....
Blake	Year	40	33	10	43	1,075.00	421	1.15	28.75	5	1	....
Brooklyn	Year	483	335	137	472	977.23	3,527	9.66	20.00	39	6	....
Columbia *b*	Year	204	65	25	90	441.19	629	1.72	8.43	22	....	....
Detroit	Year	206	78	17	95	461.17	1,441	3.95	19.17	27	....	....
Dolphin *c*	326 days	93	93	31	124	1,333.33	584	1.79	17.05	15	....	....
Essex	Year	239	222	55	277	1,159.00	2,113	5.79	24.23	12	....	1
Fern	Year	46	21	7	28	608.70	170	.47	10.22	2	....	....
Fish Hawk	Year	40	14	2	16	400.00	57	.16	4.00	1	....	....
Helena *a*	177 days	82	68	11	79	963.41	477	2.69	15.65	9	....	....
Indiana	Year	443	307	76	383	864.56	2,339	6.41	14.47	42	2	3
Iowa *a*	199 days	253	151	38	189	747.04	1,087	5.46	11.77	20	6	1
Katahdin *d*	107 days	23	16	2	18	782.61	87	.81	10.25	9	....	....
Maine	Year	365	104	38	142	389.04	765	2.10	5.75	13	....	3
Marblehead	Year	210	129	81	210	1,000.00	1,810	4.96	23.63	27	1	2
Massachusetts	Year	448	235	69	304	678.57	1,873	5.13	11.45	36	2	....
Monongahela *c*	110 days	81	59	17	76	938.27	340	3.09	11.40	3	....	....
Montgomery	Year	241	165	19	184	763.48	1,178	3.23	13.40	14	1	....
Nashville *a*	135 days	60	24	7	31	516.67	186	1.38	8.57	7	....	....
Newark *d*	76 days	60	51	15	66	1,100.00	474	6.24	21.44	11	....	....
Newport *a*	88 days	31	21	5	26	838.71	163	1.85	14.23	8	....	....
New York	Year	535	262	80	342	639.25	2,543	6.97	13.03	63	1	....
Puritan	Year	195	71	31	102	523.08	569	1.56	8.00	22	2	....
Terror	Year	152	82	36	118	776.32	757	2.07	13.62	19	1	....
Texas	Year	369	219	74	293	794.04	1,901	5.21	14.12	32	....	....
Torpedo-boat flotilla *a*	92 days	12	12	4	16	1,333.33	40	.43	8.89	6	....	....
Vesuvius *a*	354 days	62	32	6	38	612.90	321	.91	14.00	4	....	....
Vicksburg *a*	70 days	20	6	4	10	500.00	46	.66	6.29	2	....	....
Wilmington *a*	233 days	110	112	36	148	1,345.45	893	3.83	20.52	26	2	2

a Commissioned.
b In ordinary at League Island Navy-Yard 230 days.
c Commissioned and out of commission.
d Out of commission.

TABLE III.—*Pacific Station.—Average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship, for the year 1897.*

Names of ships.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Adams	Year	159	89	21	110	691.82	1,004	2.75	17.29	5	....	....
Albatross	Year	59	21	2	23	389.83	204	.56	9.49	1	....	....
Alert	Year	129	44	22	66	511.63	534	1.46	11.32	13	....	....
Baltimore *a*	81 days	87	41	12	53	609.20	318	3.93	10.03	2	....	....
Bennington	Year	181	162	37	199	1,099.45	1,394	3.84	21.22	14	1	....
Concord *a*	224 days	102	57	17	74	725.49	752	3.36	19.89	11	....	....
Gedney	Year	32	8	4	12	375.00	104	.29	9.06	1	....	1
Marion *b*	344 days	171	86	50	136	795.32	931	2.71	14.89	27	....	2
McArthur	Year	27	11	2	13	481.48	39	.11	4.07	3	....	....
Marietta *a*	122 days	43	32	8	40	930.23	320	2.62	20.15	3	....	....
Monadnock	Year	166	118	28	146	879.52	877	2.40	14.46	24	....	....
Monterey	Year	175	102	32	134	765.71	868	2.38	13.60	18	....	....
Oregon	Year	439	157	75	232	528.47	1,621	4.44	10.11	26	1	....
Patterson	Year	58	15	2	17	293.10	282	.77	13.27	1	1	....
Philadelphia *b*	288 days	299	105	36	141	471.57	1,238	4.30	11.32	21	....	3
Pinta *b*	216 days	33	20	9	29	878.79	145	.67	11.75	16	....	....
Thetis *b*	198 days	50	25	19	44	880.00	285	1.44	15.48	6	....	....
Wheeling *a*	144 days	51	29	12	41	803.92	172	1.19	9.15	9	....	....

a Commissioned. *b* Out of commission.

TABLE IV.—*Great Lakes.—Average complement, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, and discharges from the service for the year 1897.*

Name of ship.	Period in commission.	Average complement.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Michigan	Year	98	22	2	24	255.10	135	.37	3.77	....	1	....

TABLE V.—*South Atlantic Station.—Average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1897.*

Names of ships.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Castine	Year	142	107	38	145	1,021.13	1,631	4.47	31.48	24	....	1
Lancaster	Year	236	129	48	177	750.00	2,108	5.78	24.49	17	2	....
Yantic *a*	181 days	62	18	10	28	451.21	485	2.68	15.06	5	1	1

a Out of commission.

TABLE VI.—*European Station.—Average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1897.*

Names of ships.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Bancroft	Year	116	55	27	82	706.90	1,014	2.78	23.97	4	....	....
Cincinnati	Year	281	134	39	173	615.66	1,850	5.07	18.04	25	....	1
Minneapolis *a*	Year	296	141	38	179	604.73	1,342	3.68	12.43	22	....	....
Raleigh	Year	342	253	51	304	888.89	2,302	6.31	18.45	30	....	1
San Francisco	Year	367	242	68	310	844.68	3,271	8.96	24.41	26	1	1

a In ordinary at League Island Navy-Yard 178 days.

TABLE VII.—*Asiatic Station.—Average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1897.*

Names of ships.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Boston	Year	264	250	48	298	1,128.79	2,993	8.20	22.53	11	3	....
Machias	Year	141	100	9	109	773.05	1,592	4.36	30.92	5	....	....
Monocacy	Year	148	98	14	112	756.76	1,178	3.23	21.82	11	1	....
Olympia	Year	447	165	34	199	445.19	2,263	6.20	13.87	44	....	3
Petrel	Year	129	148	31	179	1,387.60	1,201	3.29	25.50	9	....	....
Yorktown *a*	342 days	167	75	16	91	544.91	1,292	3.78	21.24	21	9	1

a Out of commission.

TABLE VIII.—*Receiving ships.—Average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1897.*

Names of ships.	Periods in commission.	Average complements.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Wabash	Year	190	86	20	106	557.89	834	2.28	12	14	....	1
Vermont	Year	362	215	36	251	693.37	1,225	3.36	9.28	35	7	....
Richmond	Year	161	71	19	90	559.06	225	.62	3.85	52	2	3
Franklin	Year	188	79	11	90	478.72	375	1.03	5.48	35	1	....
Independence	Year	290	238	39	277	955.17	1,382	3.79	13.07	56	2	3

TABLE IX.—*Navy-yards, marine barracks, and other shore stations.—Average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths for the year 1897.*

Names.	Periods.	Average complements.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Yards and marine barracks:												
Portsmouth	Year	143	90	25	115	804.20	517	1.42	9.23	43	....	1
Boston	Year	207	141	24	165	797.10	832	2.28	11.01	42	1	1
New York	Year	365	232	61	293	802.74	1,709	4.68	12.82	48	3	2
Philadelphia	Year	116	82	13	95	818.96	492	1.35	11.64	35	....	....
Washington	Year	174	184	26	210	1,268.97	868	2.39	13.16	51	1	1
Norfolk	Year	142	144	12	156	1,098.59	695	1.90	13.38	68	....	1
Pensacola	Year	15	6	1	7	466.67	60	.16	10.67	....	1	....
Mare Island	Year	198	109	37	146	737.37	862	2.36	11.92	16	....	....
Sitka	Year	36	9	5	14	388.89	......	......	....	14	....	....
Marine headquarters.	Year	193	192	37	229	1,186.53	778	1.13	5.85	73	....	1
Stations at—												
Newport *a*	Year	595	286	49	335	563.03	834	2.29	3.85	239	3	1
New London	Year	10	12	....	12	1,200.00	75	.21	21	....	....	....
Annapolis	Year	456	425	51	476	1,043.86	2,710	7.42	16.28	1	1	2
Indian Head	Year	7	2	....	2	285.71	4	.01	1.43	....	....	....
Port Royal	Year	46	24	6	30	652.17	336	.92	20	1	....	....
Puget Sound	Year	35	13	6	19	542.86	110	.30	8.57	....	....	....
Special duty at—												
Boston	Year	....	1	1	2	....	1	.002	....	....	1	1
New York	Year	....	6	....	6	....	56	.15	....	....	5	1
Philadelphia	Year	....	30	2	32	....	214	.58	....	....	1	2
Washington	Year	....	59	7	66	....	675	1.85	....	4	3	3
Norfolk	Year	....	1	....	1	....	29	.08	....	....	....	....
San Francisco	Year	....	1	....	1	....	3	.008	....	1	....	....

a Includes Torpedo Station and U. S. T. S. Constellation.

TABLE X.—*Force afloat.—General aggregate, 1897.*

Classification of diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
Class I.												
Parasites and parasitic diseases	1	25	.....	23	2	1	....	....	....	....	....	157
Class II.												
General infectious diseases (non-venereal)	21	1,542	153	1,396	287	3	4	....	1	7	18	11,359
Class III.												
Constitutional disorders of nutrition	2	37	8	24	18	2	1	....	....	....	2	426
Class IV.												
Diseases of the nervous system	5	661	55	626	71	14	....	1	....	1	8	3,934
Class V.												
Diseases of the visual apparatus	3	118	8	93	28	3	....	....	....	....	5	1,363
Class VI.												
Diseases of the auditory apparatus	4	52	3	46	12	....	....	....	....	....	1	336
Class VII.												
Diseases of the olfactory apparatus	.....	41	2	38	4	....	....	....	....	....	1	159
Class VIII.												
Diseases of the nutritive apparatus:												
Subsidiary class 1—Diseases of the digestive apparatus	19	1,378	52	1,340	89	1	2	....	....	1	16	6,181
Subsidiary class 2—Diseases of the circulatory apparatus	3	113	14	76	47	3	....	....	....	2	2	1,480
Subsidiary class 3—Diseases of the respiratory apparatus	7	623	34	576	76	4	....	....	....	....	8	3,840
Class IX.												
Diseases of the motory apparatus	13	384	23	366	40	3	1	....	1	....	9	2,768
Class X.												
Diseases of the cutaneous apparatus	13	705	52	717	48	....	....	....	....	....	5	5,581
Class XI.												
Venereal diseases and diseases of the genito-urinary apparatus	37	1,208	119	1,007	300	18	....	....	1	....	38	15,802
Class XII.												
Cysts and new growths	1	15	.....	11	5	....	....	....	....	....	.....	92
Class XIII.												
Injuries	39	1,793	63	1,702	131	6	2	....	1	19	34	14,457
Class XIV.												
Extraneous bodies	.....	6	.....	6	......	....	....	....	....	....	.....	30
Class XV.												
Poisons	1	183	8	177	10	....	....	....	....	4	1	740
Total	169	8,884	594	8,224	1,168	58	10	1	4	34	148	68,705

TABLE XI.—*Force afloat—Detailed statement, 1897.*

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS I.												
Parasites and parasitic diseases.												
Ascaris lumbricoides		1		1								6
Echinococcus		1			1							19
Pediculus	1	4		5								25
Pityriasis		1		1								5
Pulex penetrans		1		1								1
Scabies		2		1	1							5
Tænia		5		5								10
Tinea favosa		2		1		1						26
Tinea trichophytina		8		8								60
CLASS II.												
General infectious diseases (non-venereal).												
Cachexia malarialis		24	1	22	3							105
Catarrhus epidemicus		402	11	389	22						2	1,765
Cholera morbus		22		21						1		44
Diphtheria		1			1							0
Dysenteria acuta		10	2	11	1							142
Dysenteria chronica		2		1	1							10
Erysipelas		5		3	2							21
Febris enterica	2	48	14	22	36					2	4	1,059
Febris intermittens	1	354	49	385	18						1	1,635
Febris pneumonica		37	3	15	23					2		470
Febris remittens	1	228	30	222	30	1	1				5	1,771
Morbilli		36		10	26							187
Parotitis epidemica		40	1	13	28							142
Pertussis		1	1	2								41
Rheumatismus articularis acutus	8	124	23	125	26	1					3	1,722
Rheumatismus articularis chronicus	1	51	12	36	27						1	736
Rubella		6		4	2							40
Septicæmia		1		1								6
Tuberculosis pneumonica acuta		9		2	7							126
Tuberculosis pneumonica chronica	2	37	3	4	31	1	3			2	1	488
Tuberculosis of other parts		1		1								64
Vaccina	6	94	1	100					1			665
Varicella		6		6								43
Variola		3	2	1	3						1	77
CLASS III.												
Constitutional disorders of nutrition.												
Anæmia	2	15	2	9	9	1						229
Debilitas senilis		10		3	6	1						99
Diabetes mellitus		2			1		1					12
Lithæmia		7	4	7	2						2	61
Purpura simplex		1		1								9
Other diseases of this class		2	2	4								16
CLASS IV.												
Diseases of the nervous system.												
Apoplexia		2		1						1		5
Cephalalgia		45	2	46	1							188
Dementia		7			6	1						120
Epilepsia		25	8	20	7	5					1	295
Febris continua simplex	1	117		110	5						3	646
Febris ephemera	1	123	9	133								404
Febris thermica		14	1	12	3							85
Hemicrania		1		1								2
Hemiplegia		10		1	9							102
Insomnia		2		1		1						33
Irritatio spinalis		2	1		2						1	59

TABLE XI.—*Force afloat—Detailed statement, 1897*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS IV.—Continued.												
Diseases of the nervous system—Cont'd.												
Mania		1	1		2							16
Melancholia		12	3	2	13							278
Meningitis		1			1							40
Monoplegia		4	2	4	1						1	71
Nausea marina		60	7	66		1						182
Neuralgia	2	82	5	87	2							414
Neurasthenia		19	3	10	8	4						230
Neuritis		5		5								30
Neuritis multiplex		1			1							30
Neurosis hysteroidea		2		2								10
Paranoia		4			3			1				22
Prostratio thermica		64	3	66	1							163
Sciatica		18	5	19	2						2	280
Sclerosis lateralis spastica			1		1							0
Sclerosis multiplex		1			1							2
Sclerosis spinalis posterior		1	1	1	1							6
Syncope		6		6								22
Torticollis spasmodica		4		4								11
Vertigo	1	24	3	26	1	1						151
Other diseases of this class		4		3		1						37
CLASS V.												
Diseases of the visual apparatus.												
Amblyopia		6		2	4							27
Asthenopia	1	3	1	3	1	1						87
Astigmatismus		3	1	2	2							9
Blepharitis		1	1	1	1							3
Cataracta		1			1							1
Conjunctivitis	1	56	2	57							2	448
Corneæ ulcus		7		3	4							205
Dacryocystitis		1		1								7
Ectropium		1		1								8
Entropium		1		1								9
Glaucoma		2	1		2	1						45
Hordeolus	1	4		5								14
Iritis		11		6	3						2	164
Keratitis		10	1	9	1						1	118
Leucoma		1			1							1
Myopia		2	1		3							65
Neuritis optica		1			1							46
Obstructio lacrimalis		1				1						13
Retinitis		4			4							75
Trachoma		1		1								17
Other diseases of this class		1		1								1
CLASS VI.												
Diseases of the auditory apparatus.												
Otalgia		5		5								15
Otitis externa	3	16		18	1							124
Otitis media	1	24	3	18	9						1	183
Surditas		6		5	1							9
Other diseases of this class		1			1							5
CLASS VII.												
Diseases of the olfactory apparatus.												
Antri abscessus		1		1								7
Catarrhus æstivus		1		1								5
Rhinitis acuta		31	1	32								120
Rhinitis chronica		6	1	3	3						1	21
Other diseases of this class		2		1	1							6

TABLE XI.—*Force afloat—Detailed statement, 1897*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.												
Subsidiary Class 1.—Diseases of the digestive apparatus.												
Adenitis salivosa		3		2	1							13
Ani prolapsio		3		2	1							16
Ani rhagades		4		2	1						1	18
Appendicitis	1	18	2	11	9					1		443
Catarrhus gastricus acutus		53		47	6							182
Catarrhus gastricus chronicus		9	2	6	3						2	98
Catarrhus intestinalis acutus		69	2	67	4							430
Catarrhus intestinalis chronicus		8	1	4	3	1					1	208
Cholelithiasis		3		2	1							12
Colica		163	13	172	3						1	459
Constipatio		55		51	3						1	143
Dentis caries		9		8							1	31
Diarrhœa simplex	3	309	10	318	4							887
Dyspepsia nervosa		16		14	1		1					77
Fistula in ano		8	2	3	7							69
Gastralgia	1	9	1	10	1							104
Hæmatemesis		3		3								10
Hæmorrhois	2	46	1	35	14							197
Hepatis congestio		18		17	1							81
Hepatitis acuta		3	1	3	1							77
Hepatitis suppurativa		2		1							1	50
Icterus		31		24	5		1				1	328
Obstructio intestinalis		2		2								21
Odontalgia		8		8								28
Periodontitis		3	2	5								30
Peritonitis		5	1	6								33
Pharyngitis	1	37	1	39								136
Stomatitis		2		2								10
Tonsillitis	10	468	13	468	16						7	1,916
Typhlitis		6		4	2							47
Ulcus gastricum		1			1							2
Other diseases of this class	1	4		4	1							25
Subsidiary Class 2—Diseases of the circulatory apparatus.												
A—Blood vessels:												
Aneurysma		2			2							1
Angina pectoris		5	1	3	2	1						80
Cordis dilatatio		1		1								2
Cordis hypertrophia		5		1	2	2						30
Cordis palpitatio		16	6	13	9							209
Cordis valvularum morbus	1	7	2	3	6					1		62
Myocarditis		1								1		5
Phlebitis		1		1								6
Thrombosis		2		1	1							19
Varix		3	1		4							114
B—Lymphatics:												
Bronchocele		1			1							0
Lymphadenitis	2	63	4	49	19						1	872
Lymphangitis		6		4	1						1	80
Subsidiary Class 3—Diseases of the respiratory apparatus.												
Asthma	2	19	4	13	9	3						231
Bronchopneumonitis		12	1	9	4							114
Bronchitis acuta	1	307	10	297	17						4	1,719
Bronchitis chronica	2	45	2	33	15	1						446
Catarrhus bronchialis	1	162	8	162	7						2	717
Emphysema pulmonalis		1		1								4
Hæmoptysis		17	5	13	8						1	237
Laryngitis acuta		21		20							1	71
Laryngitis chronica		2		1	1							11
Pleuritis acuta		32		23	9							220
Pleuritis chronica	1	4	2	4	3							28
Pleuritis purulenta		1	2		3							42

TABLE XI.—*Force afloat—Detailed statement, 1897*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS IX.												
Diseases of the motory apparatus.												
Ankylosis		1			1							0
Arthritis		12	2	11	2				1			272
Arthritis deformans		2		1	1							83
Bursitis	1	11	1	13								85
Caries	1	2		2	1							41
Contractura		1		1								38
Myalgia acuta	9	270	10	268	14	1					6	1,397
Myalgia chronica		27	5	21	10	1						223
Necrosis		4	1	3	1		1					103
Ostitis		2			2							0
Periostitis		11	1	7	4						1	165
Synovitis	1	35	3	35	2	1					1	319
Thecitis	1	3		3	1							11
Other diseases of this class		3		1	1						1	31
CLASS X.												
Diseases of the cutaneous apparatus.												
Abscessus	4	317	17	319	17						2	2,485
Acne		1		1								1
Carbunculus		12	3	13							2	144
Cellulitis	2	22	2	24	2							161
Clavus		4		4								84
Cutis fissuræ		3		3								34
Ecthyma		2		2								8
Eczema	1	24	7	26	5						1	314
Erythema		9		9								35
Furunculus	1	179	14	192	2							1,088
Herpes simplex		1		1								12
Herpes zoster		10		10								100
Impetigo		2		2								14
Lichen		2		1	1							5
Onychia		6	1	7								71
Paronychia	1	30		31								221
Prurigo		2	1	3								16
Psoriasis		2		1	1							28
Ulcus	3	57	6	47	19							627
Unguis involutus	1	7		8								74
Urticaria		8		8								26
Verruca		1	1	2								15
Other diseases of this class		4		3	1							18
CLASS XI.												
Venereal diseases and diseases of the genito-urinary apparatus.												
Adenitis inguinalis (venereal)	8	192	18	156	49						13	3,361
Arthritis gonorrhoica		35	4	14	18	5					2	746
Balanitis	1	8		9								62
Calculus		1			1							36
Chancroid	3	121	7	102	26				1		2	1,787
Cystitis	1	33		24	9						1	415
Enuresis		2		1	1							9
Epididymitis	6	109	11	99	22						5	1,525
Fistula urinalis		2	1	1	2							29
Gonorrhœa	4	235	12	213	28	1					9	2,198
Hæmaturia	1	6		7								69
Hydrocele		3		2	1							6
Nephritis acuta		8		3	5							57
Nephritis chronica		9	1	1	8	1						115
Nephrolithiasis		6		6								24
Ophthalmia gonorrhoica		2			2							43
Orchitis	8	140	18	145	15						6	2,087
Paraphimosis		4		4								68
Phimosis	1	30		30	1							458
Prostatitis		5		2	3							40

TABLE XI.—*Force afloat—Detailed statement, 1897*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS XI—continued.												
Venereal Diseases and diseases of the genito-urinary apparatus—Cont'd.												
Pyelitis		3		1	2							48
Spermatorrhœa		1			1							3
Syphilis consecutiva	3	166	39	123	76	9						1, 727
Syphilis primitiva		42	4	28	17	1						422
Urethræ strictura	1	27	2	20	10							197
Urethritis simplex		1		1								19
Urinæ retentio		3		2	1							9
Varicocele		10	2	10	1	1						113
Verruca acuminata		3		2	1							28
Other diseases of this class		1		1								1
CLASS XII.												
Cysts and new growths.												
Adenoma		2		1	1							3
Cystis	1	7		7	1							47
Fibroma		1			1							1
Lipoma		3		3								23
Osteoma		1			1							1
Other diseases of this class		1			1							17
CLASS XIII.												
Injuries.												
Abrasio	1	37	1	39								198
Ambustio ex calore	3	111	2	105	7						4	1, 074
Ambustio ex frigore		1		1								3
Asphyxia		4	2	4	1					1		44
Asphyxia ex submersione		14		2						12		15
Concussio		18		16	2							74
Contusio	9	454	15	469	7						2	3, 060
Deformitas		4		1	3							26
Fames		1		1								2
Fractura	6	79	4	52	34					1	2	1, 381
Hernia		49	14	25	28	6	1				3	868
Luxatio	2	24	2	22	4						2	225
Membranæ tympani ruptio		3		3								19
Membri clades		1			1							2
Musculi ruptio	1	1		1	1							29
Sole excoctus		5		5								23
Stremma	5	376	11	368	17						7	2, 190
Virium defectio		4		4								5
Vulnus contusum	3	184	3	174	11				1	1	3	1, 339
Vulnus incisum	1	140	3	138	3						3	1, 059
Vulnus laceratum	7	232	2	226	6		1				8	2, 357
Vulnus punctum		40	4	39	3					2		347
Vulnus sclopeticum	1	10		6	3					2		108
Other diseases of this class		1		1								9
CLASS XIV												
Extraneous bodies.												
Corpus extraneum		6		6								30
CLASS XV.												
Poisons.												
Alcoholismus		142	5	137	7					2	1	369
Dermatitis venenata		8	1	8	1							61
Venenum irritans		1		1								5
Venenum neuroticum		10	1	9						2		122
Vulnus venenatum	1	22	1	22	2							183
Total	169	8, 884	594	8, 224	1, 168	58	10	1	4	34	148	68, 705

TABLE XII.—*Navy-yards and other shore stations—General aggregate, 1897.*

Classification of diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
Class I.												
Parasites and parasitic diseases	.....	7	1	1	7	....	....	....	....	....	....	3
Class II.												
General infectious diseases (non-venereal)	12	643	72	537	180	....	....	....	....	7	3	3,121
Class III.												
Constitutional disorders of nutrition	.....	8	.....	7	1	....	....	....	....	....	....	51
Class IV.												
Diseases of the nervous system	2	154	9	136	20	3	2	1	....	2	1	591
Class V.												
Diseases of the visual apparatus	1	51	27	73	1	1	....	....	....	....	4	575
Class VI.												
Diseases of the auditory apparatus	.....	12	1	10	2	1	....	....	....	....	....	38
Class VII.												
Diseases of the olfactory apparatus	1	9	.....	9	1	....	....	....	....	....	....	34
Class VIII.												
Diseases of the nutritive apparatus:												
Subsidiary class 1—Diseases of the digestive apparatus	8	456	12	389	84	1	....	....	....	1	1	1,498
Subsidiary class 2—Diseases of the circulatory apparatus	1	20	2	11	8	3	....	....	....	1	.....	165
Subsidiary class 3—Diseases of the respiratory apparatus	7	241	9	198	53	2	....	....	....	....	4	1,121
Class IX.												
Diseases of the motory apparatus	1	66	4	59	10	1	....	....	....	....	1	477
Class X.												
Diseases of the cutaneous apparatus	8	156	9	137	33	....	1	....	....	....	2	1,005
Class XI.												
Venereal diseases and diseases of the genito urinary apparatus	5	222	22	88	155	3	....	....	....	2	1	1,045
Class XII.												
Cysts and new growths	.....	4	.....	2	2	....	....	....	....	....	....	19
Class XIII.												
Injuries	4	312	7	246	67	4	....	....	....	4	2	1,975
Class XIV.												
Extraneous bodies	.....	1	.....	1	......	....	....	....	....	....	....	3
Class XV.												
Poisons	.....	50	3	41	12	....	....	....	....	....	....	139
Total	50	2,412	178	1,945	636	19	3	1	....	17	19	11,860

TABLE XIII.—*Navy-yards and other shore stations—Detailed statement, 1897.*

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided. To hospital.	Invalided. From service.	Invalided. On leave.	Invalided. To Government Hospital for Insane.	Deserted.	Died.	Continued to next year.	Total number of sick days.
CLASS I.												
Parasites and parasitic diseases.												
Scabies		1			1							0
Tænia		5	1	1	5							3
Tinea trichophytina		1			1							0
CLASS II.												
General infectious diseases (non-venereal.)												
Cachexia malarialis		14	2	12	4							38
Catarrhus epidemicus	3	191	6	167	32						1	970
Cholera morbus		15		15								23
Dysenteria acuta		3		1	2							3
Febris enterica		2			2							10
Febris intermittens	2	185	47	203	30						1	736
Febris pneumonica	1	10	1	3	7					2		91
Febris remittens	1	30	4	16	19							107
Morbilli		18		2	16							19
Parotitis epidemica		5		2	3							17
Rheumatismus articularis acutus	3	26	3	16	15					1		192
Rheumatismus articularis chronicus		21	2	20	3							164
Rubella		23	1	5	10							32
Scarlatina		16			16							0
Tuberculosis pneumonica acuta		1			1							1
Tuberculosis pneumonica chronica	1	5	2	1	3					4		43
Tuberculosis of other parts		1			1							6
Vaccina	1	77	4	74	7						1	669
CLASS III.												
Constitutional disorders of nutrition.												
Anæmia		1		1								10
Debilitas senilis		1			1							1
Lithæmia		5		5								35
Other diseases of this class		1		1								5
CLASS IV.												
Diseases of the nervous system.												
Apoplexia	1	1		1						1		32
Aphasia		2		1	1							8
Cephalalgia		72		71			1					124
Epilepsia		6		4	2							13
Febris continua simplex		11		6	5							75
Febris ephemera		7		6	1							12
Febris thermica		1								1		1
Hemiplegia		1		1								10
Insomnia		1		1								1
Melancholia		1	1		1			1				5
Meningitis		1			1							2
Nausea marina		1		1								2
Neuralgia		28	3	27	4							98
Neurasthenia	1	6	3	6		3	1					45
Neurosis hysteroidea		1			1							0
Paranoia		1			1							19
Paraplegia			1		1							0
Prostratio thermica		2		2								13
Sciatica		5	1	4	1						1	106
Sclerosis lateralis spastica		1			1							2
Vertigo		5		5								23

TABLE XIII.—*Navy-yards and other shore stations—Detailed statement, 1897*—Cont'd.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.						Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.	Deserted.	Died.		
CLASS V.												
Diseases of the visual apparatus.												
Asthenopia	1	13	14	26							2	192
Astigmatismus		10	7	16							1	99
Blepharitis		2		2								3
Choroiditis		2		2								124
Conjunctivitis		10	1	11								75
Hordeolus		6		6								19
Hypermetropia		2	3	4							1	35
Keratitis		2		2								5
Myopia		2	2	4								7
Pterygium		1			1							0
Trachoma		1				1						16
CLASS VI.												
Diseases of the auditory apparatus.												
Otalgia		4		4								6
Otitis externa		1			1							13
Otitis media		4		4								17
Surditas		3	1	2	1	1						2
CLASS VII.												
Diseases of the olfactory apparatus.												
Rhinitis acuta		7		7								20
Rhinitis chronica	1	2		2	1							14
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.												
Subsidiary Class 1.—Diseases of the digestive apparatus.												
Adenitis salivosa		3		1	2							6
Ani rhagades		2		2								8
Appendicitis	1	2	1		1							28
Catarrhus gastricus acutus		32	1	27	5	1						96
Catarrhus gastricus chronicus		8	1	7	2							138
Catarrhus intestinalis acutus		33		31	2							94
Catarrhus intestinalis chronicus		2		2								4
Cholelithiasis		14		14								34
Colica		22		20	2							53
Constipatio		28		26	2							72
Dentis caries		1		1								3
Diarrhœa simplex		103	2	100	5							240
Fistula in ano	1	1	1	2	1							52
Gastralgia		6	1	7								12
Hæmorrhois	1	17	2	15	5							87
Hepatis congestio		7		6	1							60
Hepatitis chronica		2			1					1		1
Icterus		4		3	1							16
Obstructio intestinalis		2		2								20
Odontalgia		5		5								7
Parulis		1		1								5
Periodontitis		2		2								10
Pharyngitis	3	29		28	4							85
Stomatitis		1		1								2
Tonsillitis	2	123	2	78	48						1	332
Typhlitis		2		2								8
Ulcus gastricum		2		1	1							12
Other diseases of this class		2	1	2	1							13

TABLE XIII.—*Navy-yards and other shore stations—Detailed statement, 1897*—Cont'd.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for insane.				
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS—continued.												
Subsidiary Class 2.—Diseases of the circulatory apparatus.												
A.—Blood vessels:												
Angina pectoris	1	3	1	3	1					1		64
Cordis hypertrophia		2		1	1							1
Cordis palpitatio		3			3							3
Cordis valvularum morbus		3	1		2	2						56
Myocarditis		1				1						1
Pericarditis		1		1								4
Phlebitis		2		2								16
Varix		1		1								1
B.—Lymphatics:												
Lymphadenitis		4		3	1							19
Subsidiary Class 3.—Diseases of the respiratory apparatus.												
Bronchitis acuta		56	5	44	15	1					1	278
Bronchitis chronica	1	9		6	4							29
Catarrhus bronchialis	4	161	4	137	29	1					3	683
Hæmoptysis		5		3	2							18
Laryngitis acuta		6		6								23
Pleuritis acuta	2	4		3	3							90
CLASS IX.												
Diseases of the motory apparatus.												
Arthritis		3		3								47
Bursitis		3		2	1							43
Myalgia acuta	1	44	2	43	3						1	220
Myalgia chronica		6		3	2	1						43
Periostitis		4		4								40
Synovitis		5	2	3	4							79
Thecitis		1		1								5
CLASS X.												
Diseases of the cutaneous apparatus.												
Abscessus	2	43	2	38	8		1					368
Carbunculus	1	6		5	2							50
Cellulitis		5		2	3							16
Clavus		4		1	3							26
Ecthyma		1			1							0
Eczema		11		7	4							82
Erythema		3		3								11
Furunculus	1	57	6	60	3						1	291
Herpes simplex		3		3								7
Herpes zoster		2		1							1	13
Onychia		1		1								2
Paronychia	3	5		7	1							47
Ulcus		7	1	5	3							64
Unguis involutus	1	7		3	5							13
Other diseases of this class		1		1								15
CLASS XI.												
Venereal diseases and diseases of the genito-urinary apparatus.												
Adenitis inguinalis (venereal)	2	25	1	7	21							160
Arthritis gonorrhoica		6	1	4	2						1	117
Balanitis		3		3								27
Chancroid		15	1	3	13							29
Cystitis	1	9		3	7							49

Table XIII.—*Navy-yards and other shore stations—Detailed statement, 1897*—Cont'd.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS XI—continued.												
Venereal diseases and diseases of the genito-urinary apparatus—Cont'd.												
Enuresis	....	3	1	1	3	....	....	....	....	....	....	11
Epididymitis	....	11	....	5	6	....	....	....	....	....	....	50
Gonorrhœa	....	87	13	32	68	....	....	....	....	....	....	171
Hydrocele	....	1	....	....	....	1	....	....	....	....	....	30
Nephritis acuta	....	1	....	1	....	....	....	....	....	....	....	1
Nephritis chronica	1	3	1	1	....	2	....	....	....	2	....	15
Nephrolithiasis	....	1	....	1	....	....	....	....	....	....	....	1
Orchitis	....	10	1	5	6	....	....	....	....	....	....	51
Phimosis	....	1	....	1	....	....	....	....	....	....	....	18
Prostatitis	1	....	....	1	....	....	....	....	....	....	....	5
Syphilis consecutiva	....	23	3	12	14	....	....	....	....	....	....	204
Syphilis primitiva	....	11	....	7	4	....	....	....	....	....	....	102
Urethræ strictura	....	5	....	1	4	....	....	....	....	....	....	4
Urethritis simplex	....	1	....	....	1	....	....	....	....	....	....	0
Varicocele	....	4	....	....	4	....	....	....	....	....	....	0
Verruca acuminata	....	2	....	....	2	....	....	....	....	....	....	0
CLASS XII.												
Cysts and new growths.												
Cystis	....	1	....	1	....	....	....	....	....	....	....	6
Fibroma	....	1	....	1	....	....	....	....	....	....	....	13
Lipoma	....	2	....	....	2	....	....	....	....	....	....	0
CLASS XIII.												
Injuries.												
Abrasio	....	14	1	13	2	....	....	....	....	....	....	66
Ambustio ex calore	....	11	....	10	1	....	....	....	....	....	....	112
Asphyxia	....	1	....	....	....	....	....	....	....	1	....	1
Asphyxia ex submersione	....	2	....	....	1	....	....	....	....	1	....	1
Concussio	....	1	....	....	1	....	....	....	....	....	....	0
Contusio	....	60	....	49	11	....	....	....	....	....	....	220
Deformitas	....	5	....	1	2	2	....	....	....	....	....	65
Fractura	1	30	1	18	11	1	....	....	....	1	1	318
Hernia	....	12	....	7	4	1	....	....	....	....	....	61
Luxatio	....	4	....	3	1	....	....	....	....	....	....	25
Stremma	....	90	2	72	19	....	....	....	....	....	1	494
Vulnus contusum	....	26	....	23	2	....	....	....	....	1	....	151
Vulnus incisum	....	17	....	14	3	....	....	....	....	....	....	108
Vulnus laceratum	2	25	....	23	4	....	....	....	....	....	....	250
Vulnus punctum	....	12	3	11	4	....	....	....	....	....	....	67
Vulnus sclopeticum	....	1	....	1	....	....	....	....	....	....	....	18
Other diseases of this class	1	1	....	1	1	....	....	....	....	....	....	18
CLASS XIV.												
Extraneous bodies.												
Corpus extraneum	....	1	....	1	....	....	....	....	....	....	....	3
CLASS XV.												
Poisons.												
Alcoholismus	....	44	2	35	11	....	....	....	....	....	....	107
Dermatitis venenata	....	3	....	2	1	....	....	....	....	....	....	9
Venenum neuroticum	....	2	1	3	....	....	....	....	....	....	....	17
Vulnus venenatum	....	1	....	1	....	....	....	....	....	....	....	6
Total	50	2,412	178	1,945	636	19	3	1	....	17	19	11,860

TABLE XIV.—*Naval hospitals.—General aggregate, 1897.*

Classification of diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
Class I.												
Parasites and parasitic diseases	1	.....	9	8	1	1	....	......	....	....	....	529
Class II.												
General infectious diseases (nonvenereal)	54	33	451	405	21	51	2	......	3	17	39	18, 269
Class III.												
Constitutional disorders of nutrition	4	1	16	11	....	7	....	......	....	....	3	1, 269
Class IV.												
Diseases of the nervous system	18	15	88	47	11	30	1	13	2	3	14	5, 248
Class V.												
Diseases of the visual apparatus	4	.....	23	15	1	7	....	......	....	....	4	1, 848
Class VI.												
Diseases of the auditory apparatus	2	2	16	8	2	9	....	......	....	....	1	1, 008
Class VII.												
Diseases of the olfactory apparatus	.....	.....	5	......	....	4	....	......	....	....	1	129
Class VIII.												
Diseases of the nutritive apparatus:												
Subsidiary class 1—Diseases of the digestive apparatus	12	9	177	165	11	4	2	......	1	6	9	5, 788
Subsidiary class 2—Diseases of the circulatory apparatus	2	7	60	33	8	14	....	......	....	1	13	3, 271
Subsidiary class 3—Diseases of the respiratory apparatus	13	4	120	102	4	16	....	......	3	1	11	4, 906
Class IX.												
Diseases of the motory apparatus	9	4	52	38	4	13	....	......	1	....	9	3, 797
Class X.												
Diseases of the cutaneous apparatus	3	2	83	66	4	5	....	......	....	....	13	3, 527
Class XI.												
Venereal diseases and diseases of the genito-urinary apparatus	65	14	462	378	20	38	....	......	4	3	98	24, 838
Class XII.												
Cysts and new growths	.....	1	7	6	....	....	....	......	....	1	1	180
Class XIII.												
Injuries	31	6	189	151	8	35	3	......	2	1	26	9, 923
Class XIV.												
Extraneous bodies	.....	.....	......	......	....	....	....	......	....	....	.....	......
Class XV.												
Poisons	.....	1	24	17	....	2	....	......	....	4	2	646
Class XVI.												
Feigned diseases	.....	.....	......	......	....	....	....	......	....	....	.....	......
Total	218	99	1, 782	1, 450	95	236	8	13	16	37	244	85, 176

TABLE XV.—*Naval hospitals.—Detailed statement, 1897.*

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided. To hospital.	Invalided. From service.	Invalided. On leave.	Invalided. To Government Hospital for Insane.	Deserted.	Died.	Continued to next year.	Total number of sick days.
CLASS I.												
Parasites and parasitic diseases.												
Echinococcus	1		1		1	1						322
Scabies			2	2								73
Tænia			5	5								121
Tinea trichophytina			1	1								13
CLASS II.												
General infectious diseases (non-venereal).												
Cachexia malarialis	1		7	6		2						341
Catarrhus epidemicus	1	1	58	54	2	1			1		2	1,418
Diphtheria	1		1	1	1							18
Dysenteria acuta			5	5								75
Erysipelas		1	2	3								203
Febris enterica	5	2	22	18						2	9	1,063
Febris intermittens	1	4	43	46		1			1			774
Febris pneumonica	6	5	32	33		1				4	5	1,672
Febris remittens	4	2	46	49	1	1					1	1,385
Morbilli		2	41	43								1,200
Parotitis epidemica	4		31	30		1			1		3	749
Rheumatismus articularis acutus	4		40	28	5	5				1	5	1,886
Rheumatismus articularis chronicus	9	3	32	22	5	10	1				6	1,874
Rubella	4		20	24								171
Scarlatina	2	5	16	21						2		545
Septicæmia		1								1		64
Tuberculosis miliaris acuta		1								1		5
Tuberculosis pneumonica acuta	5	2	9	4	1	7				2	2	1,158
Tuberculosis pneumonica chronica	5	4	39	8	6	22	1			5	6	3,529
Tuberculosis of other parts		1		1								42
Vaccina	2		7	9								161
CLASS III.												
Constitutional disorders of nutrition.												
Anæmia	2		7	6		2					1	421
Debilitas senilis	2		7	2		5					2	776
Diabetes mellitus			1	1								12
Lithæmia		1	1	2								60
CLASS IV.												
Diseases of the nervous system.												
Apoplexia		1	1							2		25
Aphasia			1	1								47
Atrophia muscularis progressiva	1					1						10
Cephalalgia	1		2	2	1							99
Dementia		1	6	2		1		4				203
Encephalitis		1	1			1				1		58
Epilepsia	2		9	2		8					1	686
Febris continua simplex	2		10	9	1						2	257
Febris ephemera			3	3								97
Febris thermica			3	2	1							109
Hemiplegia		2	7	3	1	1					4	673
Irritatio spinalis			1								1	154
Mania		3	3		1			5				95
Melancholia	1	1	13	4	4	2		3	1		1	532
Meningitis		1	2	2		1						144
Monoplegia	1	2	1	1		2					1	367
Neuralgia	2		6	8								304
Neurasthenia	4	2	5	4	1	5	1					431
Neuritis	1	1				1					1	106
Neurosis hysteroidea			1	1								2
Paranoia			4			2		1	1			187

TABLE XV.—*Naval hospitals.—Detailed statement, 1897*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS IV—continued.												
Diseases of the nervous system—C't'd.												
Paraplegia			1								1	165
Prostratio thermica			1	1								28
Sciatica	2		3	2	1	1					1	214
Sclerosis lateralis spastica			2			1					1	181
Sclerosis multiplex			1			1						21
Sclerosis spinalis posterior	1		1			2						53
CLASS V.												
Diseases of the visual apparatus.												
Amblyopia			4	3		1						121
Asthenopia	1		1	2								26
Astigmatismus			2			2						180
Blepharitis			1	1								21
Cataracta			1			1						100
Conjunctivitis	1			1								17
Corneæ ulcus			3	1							2	210
Iritis	2		2	2		2						217
Keratitis			1			1						243
Leucoma			1	1								153
Myopia			1								1	245
Neuritis optica			2	1	1							129
Pterygium			1	1								21
Retinitis			3	2							1	165
CLASS VI.												
Diseases of the auditory apparatus.												
Otitis externa			3		1	2						144
Otitis media	2	1	10	6	1	5					1	707
Surditas		1	2	2		1						124
Other diseases of this class			1			1						33
CLASS VII.												
Diseases of the olfactory apparatus.												
Rhinitis chronica			4			4						86
Other diseases of this class			1								1	43
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.												
Subsidiary Class 1.—Diseases of the digestive apparatus.												
Adenitis salivosa			3	3								93
Ani prolapsio	1	1	1	2							1	286
Ani rhagades			1	1								81
Appendicitis			9	8						1		228
Catarrhus gastricus acutus			11	9	1	1						293
Catarrhus gastricus chronicus			6	3	1		1		1			182
Catarrhus intestinalis acutus			8	7	1							117
Catarrhus intestinalis chronicus	2	1	4	2	2		1				2	617
Cholelithiasis	1			1								73
Colica			5	5								125
Constipatio			5	2	1	1					1	207
Diarrhœa simplex		1	9	9	1							136
Dyspepsia nervosa			1	1								69
Fistula in ano	3		8	11								384
Gastralgia			1	1								36

TABLE XV.—*Naval hospitals.—Detailed statement, 1897*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS—continued.												
Subsidiary Class 1.—Diseases of the digestive apparatus—Continued.												
Hæmorrhois	1	2	19	18	2	1	....	....	....	....	1	853
Hepatis congestio	....	....	2	1	....	....	....	....	....	....	1	52
Hepatitis chronica	....	....	1	1	....	....	....	....	....	....	....	94
Hepatitis suppurativa	....	....	2	....	....	....	....	....	....	2	....	88
Icterus	1	....	4	4	....	....	....	....	....	....	1	157
Intestini recti strictura	....	....	1	....	....	....	....	....	....	1	....	17
Œsophagostenosis	1	....	1	1	1	....	....	....	....	....	....	63
Peritonitis	....	....	1	....	....	....	....	....	....	1	....	17
Pharyngitis	....	2	4	6	....	....	....	....	....	....	....	166
Tonsillitis	2	1	64	63	1	1	....	....	....	....	2	1,169
Typhlitis	....	....	1	1	....	....	....	....	....	....	....	34
Ulcus gastricum	....	1	2	3	....	....	....	....	....	....	....	98
Other diseases of this class	....	....	2	2	....	....	....	....	....	....	....	40
Subsidiary Class 2.—Diseases of the circulatory apparatus.												
A—Blood vessels—												
Aneurysma	....	1	2	....	....	....	....	....	....	....	3	411
Angina pectoris	....	1	3	1	....	2	....	....	....	....	1	197
Cordis hypertrophia	....	....	1	1	....	....	....	....	....	....	....	34
Cordis palpitatio	1	....	12	3	2	6	....	....	....	....	2	407
Cordis valularum morbus	....	2	13	5	2	5	....	....	....	1	2	711
Thrombosis	....	....	1	1	....	....	....	....	....	....	....	25
Varix	1	....	3	3	1	....	....	....	....	....	....	198
B—Lymphatics—												
Bronchocele	....	....	1	....	....	1	....	....	....	....	....	32
Lymphadenitis	....	3	17	16	3	....	....	....	....	....	1	1,028
Lymphangitis	....	....	7	3	....	....	....	....	....	....	4	228
Subsidiary Class 3.—Diseases of the respiratory apparatus.												
Asthma	1	....	8	3	1	4	....	....	....	....	1	390
Bronchopneumonitis	....	....	4	3	....	....	....	....	....	1	....	108
Bronchitis acuta	....	....	28	22	....	2	....	....	1	....	3	686
Bronchitis chronica	2	....	18	14	....	2	....	....	....	....	4	1,051
Catarrhus bronchialis	5	....	36	38	....	1	....	....	....	....	2	782
Hæmoptysis	2	1	10	5	3	4	....	....	....	....	1	379
Larnygitis chronica	....	....	1	1	....	....	....	....	....	....	....	53
Pleuritis acuta	1	2	12	14	....	....	....	....	1	....	....	947
Pleuritis chronica	2	1	2	2	....	2	....	....	1	....	....	499
Pleuritis purulenta	....	....	1	....	....	1	....	....	....	....	....	11
CLASS IX.												
Diseases of the motory apparatus.												
Ankylosis	....	1	1	....	....	1	....	....	....	....	1	279
Arthritis	2	....	2	1	....	2	....	....	....	....	1	510
Arthritis deformans	....	....	1	....	....	1	....	....	....	....	....	46
Bursitis	....	1	1	2	....	....	....	....	....	....	....	120
Caries	....	....	1	1	....	....	....	....	....	....	....	112
Myalgia acuta	2	....	14	8	2	2	....	....	1	....	3	927
Myalgia chronica	2	1	18	12	2	5	....	....	....	....	2	1,064
Necrosis	....	1	1	1	....	....	....	....	....	....	1	104
Ostitis	....	....	2	1	....	....	....	....	....	....	1	81
Periostitis	1	....	3	3	....	1	....	....	....	....	....	127
Synovitis	2	....	6	7	....	1	....	....	....	....	....	381
Thecitis	....	....	2	2	....	....	....	....	....	....	....	46

TABLE XV.—*Naval hospitals.—Detailed statement, 1897*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS X.												
Diseases of the cutaneous apparatus.												
Abscessus	1	1	25	25							2	1,413
Carbunculus	1		2	3								44
Cellulitis			6	4							2	169
Clavus			2	1							1	184
Eczema	1		9	8		1					1	196
Erythema			1	1								33
Furunculus			4	3							1	72
Lichen			1	1								48
Paronychia			1	1								6
Psoriasis			1	1								81
Ulcus		1	25	14	4	4					4	1,133
Unguis involutus			5	3							2	109
Other diseases of this class			1	1								39
CLASS XI.												
Venereal diseases and diseases of the genito-urinary apparatus.												
Adenitis inguinalis (venereal)	5	1	74	54	5	1			1		19	3,475
Arthritis gonorrhoica	2	1	17	5		5					10	1,163
Calculus			18	7	2	1					8	966
Chancroid	6		22	25		1					2	938
Cystitis	3		18	15	2	2					2	917
Enuresis			4	3							1	208
Epididymitis	1	1	26	21	2	3					2	1,215
Fistula urinalis			2	1							1	104
Gonorrhœa	16	1	94	97		1			1		12	3,762
Hydrocele			1	1								30
Nephritis acuta			6	5	1							286
Nepritis chronica	1	4	6	6		3				2		723
Ophthalmia gonorrhoica			2	1		1						187
Orchitis	1		23	19		1					4	779
Phimosis			1								1	4
Prostatitis			4	1	1				1		1	210
Pyelitis			1								1	43
Spermatorrhœa			1	1								9
Syphilis consecutiva	26	6	97	81	5	17			1	1	24	7,763
Syphilis primitiva	2		20	13	1	2					6	1,071
Urethræ strictura	2		15	12	1						4	725
Urethritis simplex			1	1								21
Urinæ retentio			1	1								11
Varicocele			5	5								173
Verruca acuminata			3	3								55
CLASS XII.												
Cysts and new growths.												
Adenoma			1	1								6
Carcinoma		1								1		4
Cystis			1	1								14
Fibroma			2	2								56
Lipoma			2	2								35
Osteoma			1								1	65
CLASS XIII.												
Injuries.												
Abrasio			2	2								49
Ambustio ex calore	2		7	6			1				2	255
Asphyxia ex submersione			1	1								2
Concussio	1		2	3								76

TABLE XV.—*Naval hospitals.—Detailed statement, 1897*—Continued.

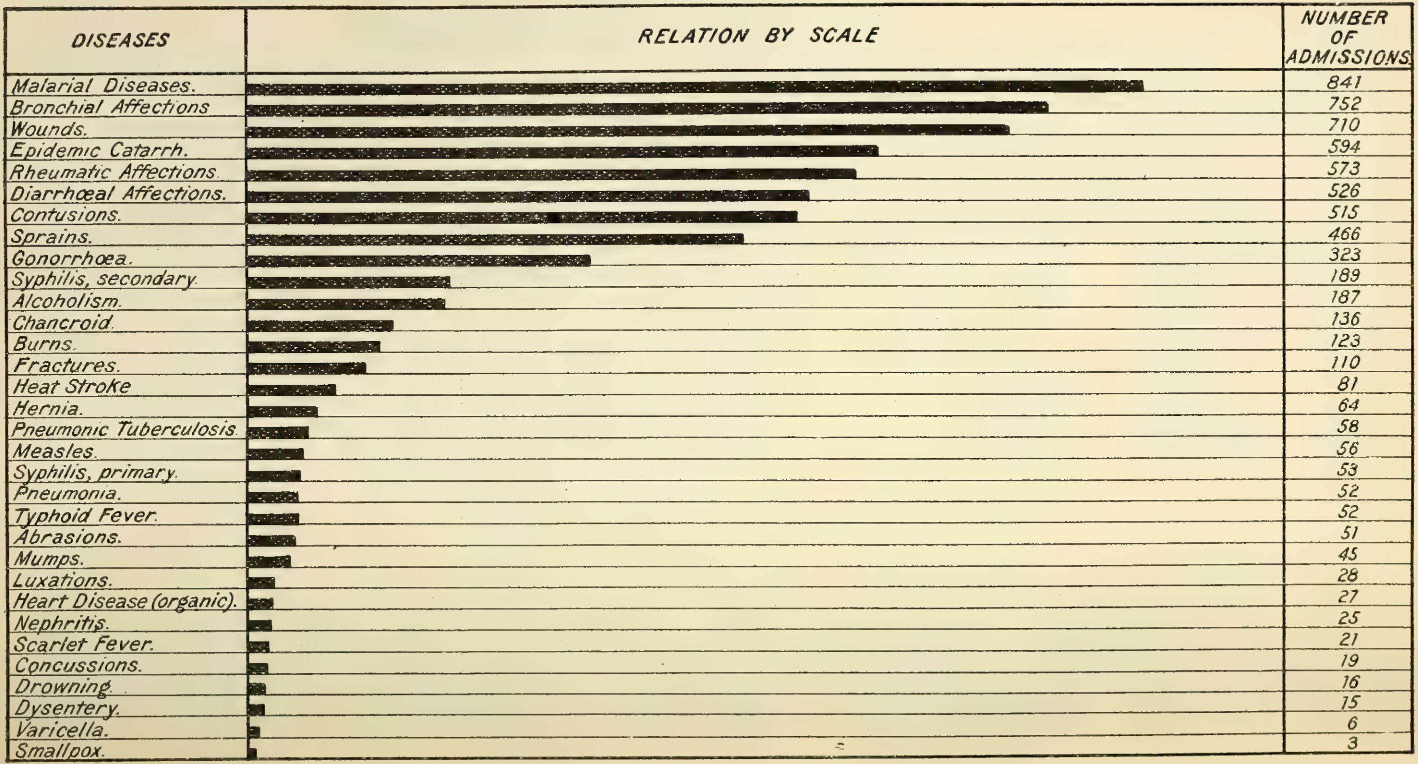
Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave	To Government Hospital for Insane.				
CLASS XIII—continued.												
Injuries—Continued.												
Contusio	2	1	20	19	1	1	....	....	....	....	2	832
Deformitas	.....	1	5	2	......	2	....	....	....	....	2	260
Fractura	14	1	42	42	2	5	1	....	1	....	6	3, 479
Hernia	3	3	28	5	2	19	....	....	1	....	7	1, 597
Luxatio	1	.....	6	7	......	....	....	....	....	....	.....	465
Membri clades	.....	.....	1	1	......	....	....	....	....	....	1	88
Musculi ruptio	.....	.....	1	1	......	....	....	....	....	....	.....	66
Stremma	4	.....	36	33	1	4	1	....	....	....	1	1, 441
Vulnus contusum	2	.....	12	11	1	1	....	....	....	....	1	437
Vulnus incisum	.....	.....	5	3	......	1	....	....	....	....	1	53
Vulnus laceratum	1	.....	9	8	......	....	....	....	....	....	2	354
Vulnus punctum	1	.....	7	6	1	1	....	....	....	....	.....	194
Vulnus sclopeticum	.....	.....	5	2	......	1	....	....	....	1	1	275
CLASS XV.												
Poisons.												
Alcoholismus	.....	1	19	13	......	2	....	....	....	4	1	459
Dermatitis venenata	.....	.....	3	2	......	....	....	....	....	....	1	29
Vulnus venenatum	.....	.....	2	2	......	....	....	....	....	....	.....	158
Total	218	99	1, 782	1, 450	95	236	8	13	16	37	244	85, 176

TABLE XVI.—*Report of vaccination in the Navy and Marine Corps for the year 1897.*

	Successful.	Unsuccessful.	Undetermined.	Percentage of success.
Class 1. No evidence of vaccination	254	189	289	57. 33
Class 2. Evidence of previous vaccination	882	1, 990	1, 795	30. 71
Class 3. Evidence of former attack of smallpox	1	25	16	3. 84
Total	1, 137	2, 204	2, 100	34. 03

TABLE XVII.—*Prevalence of special diseases and injuries in the Navy and Marine Corps during the year 1897.*

[Average strength, 15,229.]



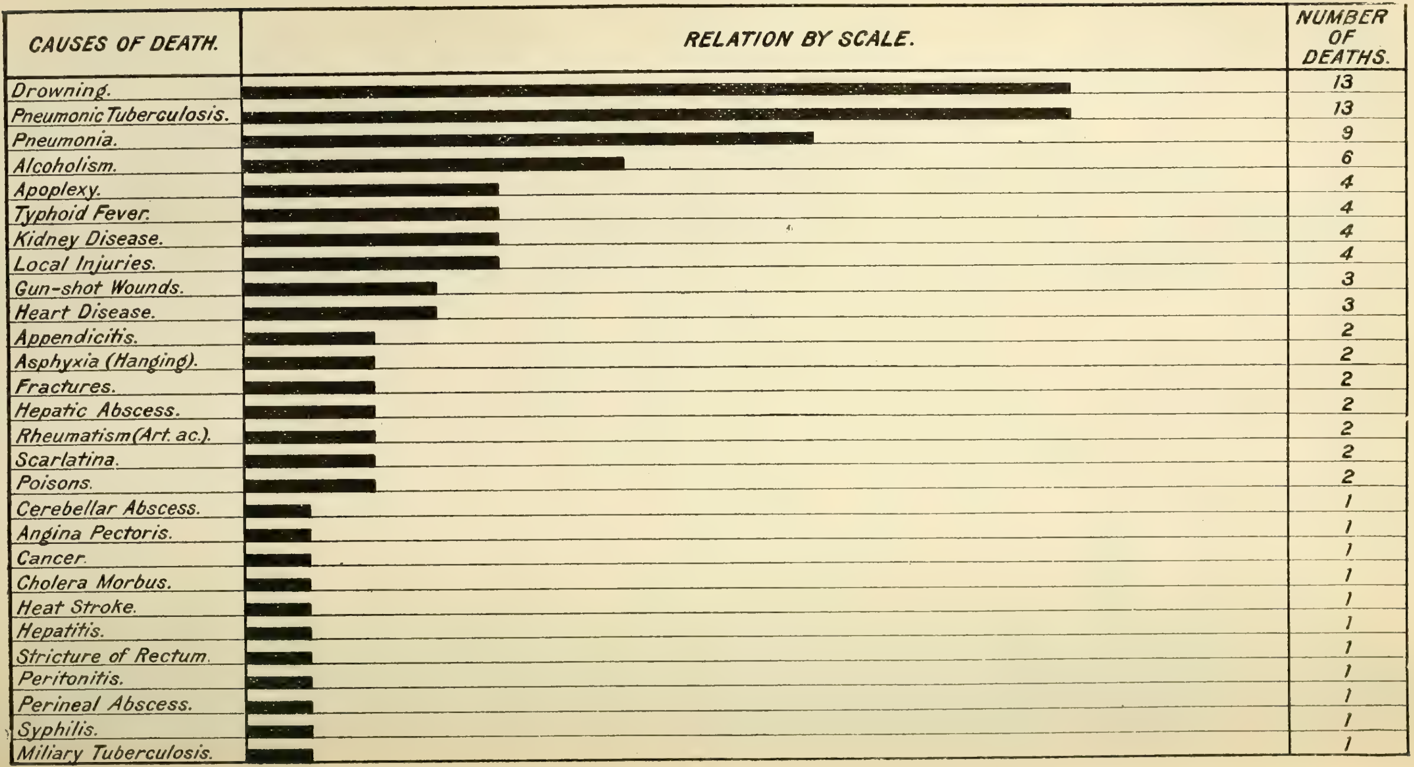
DISEASES	RELATION BY SCALE	NUMBER OF ADMISSIONS
Malarial Diseases.		841
Bronchial Affections		752
Wounds.		710
Epidemic Catarrh.		594
Rheumatic Affections.		573
Diarrhœal Affections.		526
Contusions.		515
Sprains.		466
Gonorrhœa.		323
Syphilis, secondary.		189
Alcoholism.		187
Chancroid.		136
Burns.		123
Fractures.		110
Heat Stroke		81
Hernia.		64
Pneumonic Tuberculosis.		58
Measles.		56
Syphilis, primary.		53
Pneumonia.		52
Typhoid Fever.		52
Abrasions.		51
Mumps.		45
Luxations.		28
Heart Disease (organic).		27
Nephritis.		25
Scarlet Fever.		21
Concussions.		19
Drowning.		16
Dysentery.		15
Varicella.		6
Smallpox.		3

TABLE XVIII.—*Mortuary record of the Navy and Marine Corps for the year 1897.*

Causes of death.	Number of deaths.				Average age.
	Hospitals.	Yards and stations.	Vessels.	Total.	
Abscessus cerebelli	1			1	22.00
Alcoholismus	4		2	6	32.42
Angina pectoris		1		1	47.75
Apoplexia	2	1	1	4	49.34
Appendicitis	1		1	2	22.25
Asphyxia ex submersione		1	12	13	24.67
Asphyxia (suicide by hanging)		1	1	2	39.42
Bronchopneumonitis	1			1	45.75
Carcinoma	1			1	53.67
Cholera morbus			1	1	35.00
Cordis valvularum morbus	1		1	2	36.75
Febris enterica	2		2	4	25.25
Febris pneumonica	4	2	2	8	30.97
Febris thermica		1		1	38.67
Fractura		1	1	2	22.25
Hepatitis chronica		1		1	71.00
Hepatitis suppurativa	2			2	31.67
Intestini recti strictura	1			1	51.00
Myocarditis			1	1	57.34
Nephritis chronica	2	2		4	48.17
Peritonitis	1			1	56.00
Rheumatismus articularis acutus	1	1		2	43.34
Scarlatina	2			2	16.92
Septicæmia (perineal abscess)	1			1	27.58
Syphilis consecutiva	1			1	31.50
Tuberculosis miliaris acuta	1			1	26.50
Tuberculosis pneumonica acuta	2			2	25.00
Tuberculosis pneumonica chronica	5	4	2	11	32.50
Venenum neuroticum			2	2	28.17
Vulnus contusum		1	1	2	39.58
Vulnus punctum			2	2	30.67
Vulnus sclopeticum (two suicides)	1		2	3	27.25
Total	37	17	34	88	33.21

Table XIX.—*Deaths in the Navy and Marine Corps during the year 1897.*

[Average strength, 15,734; total number of deaths, 88; ratio per 1,000, 5.59.]



CAUSES OF DEATH.	RELATION BY SCALE.	NUMBER OF DEATHS.
Drowning.		13
Pneumonic Tuberculosis.		13
Pneumonia.		9
Alcoholism.		6
Apoplexy.		4
Typhoid Fever.		4
Kidney Disease.		4
Local Injuries.		4
Gun-shot Wounds.		3
Heart Disease.		3
Appendicitis.		2
Asphyxia (Hanging).		2
Fractures.		2
Hepatic Abscess.		2
Rheumatism (Art. ac.).		2
Scarlatina.		2
Poisons.		2
Cerebellar Abscess.		1
Angina Pectoris.		1
Cancer.		1
Cholera Morbus.		1
Heat Stroke.		1
Hepatitis.		1
Stricture of Rectum.		1
Peritonitis.		1
Perineal Abscess.		1
Syphilis.		1
Miliary Tuberculosis.		1

REPORTS ON CRUISING SHIPS.

REPORT ON THE U. S. S. OREGON.

By P. A. Lovering, *Surgeon, United States Navy.*

The year just finished has given a more complete knowledge of both the good qualities and the defects, from a sanitary point of view, of this vessel than was possible a year ago, when the *Oregon* had been in commission only a few months and was practically untried, having been at sea but a day or two at a time.

The passages to Acapulco and back, and to Puget Sound and return, although short, have furnished much useful information. The experience gained on the passage to Mexico was especially valuable as showing how far fitted the vessel was for service in the Tropics, as she was then exposed to essentially the same climatic conditions as she would be in any emergency likely to occur upon this station.

VENTILATION.

The favorable opinion expressed in my previous report as to the satisfactory ventilation of the ship has not been fully justified by the experience of the last year. In port, and even under way in cool weather, the present system seems on the whole to be satisfactory. But in moderately warm weather, both in port and at sea, several grave defects were observed.

Very faulty is the opening of the after main air duct into the engine-room hatch. When air is forced into the after half of the ship the supply is drawn from the hot and oily air constantly arising from the engine room. This air is forced into the living quarters of the ship, and instead of ameliorating the foulness of the atmosphere, makes it worse. This defect could be readily remedied, and at small cost, by carrying the air duct a few feet higher.

Ammunition passages.—The ventilation of the ammunition passages on the orlop deck is always bad when the vessel is under way. There is practically no natural ventilation, the blowers do not supply a sufficient amount of fresh air, and the temperature is high. Even at ordinary drills lasting less than an hour, the men stationed here soon become exhausted from the combined effects of the foul air and heat. I do not think that it is possible for men to endure the wretched conditions existing in these passages for much longer than an hour and be capable of effective work. The importance of this grave defect is at once recognized when it is known that all the ammunition for the VIII-inch and VI-inch guns, and for the secondary battery is handled in these passages. If in action the men supplying ammunition for so large a part of the battery must inevitably become exhausted in an hour or two, the efficiency of the ship is very materially impaired.

Citadel, or amidship section of the berth deck.—When the vessel is under way the air in that part of the berth deck included in the citadel is almost as bad as it is in the ammunition passages on the orlop deck, and the heat is even greater. Under the most favorable conditions this large compartment is poorly adapted for living quarters. There is very little natural ventilation, air and light being almost entirely excluded. It is situated over the main boilers, and through it pass the funnels, engine and fire room hatches, and several pipes carrying steam for the galley, ash hoists, boat cranes, and the like. All these boilers and pipes quickly elevate the temperature, so that the deck feels warm when you walk on it, the iron bulkheads around the funnels are hot to the hand, and the tiled floor of the bathroom, although only over the engine room and quite far from the boilers, is too warm to stand upon with comfort.

On the passage to Mexico, during the time the vessel was in the Tropics, this compartment was abandoned, owing to the extreme heat. For seven days the temperature did not fall below 105° F., the average being 108° F., the temperature of the outside air, at the same hours as the observation in the citadel, never rising above 87° F. Usually there are about seventy occupants of this section of the ship, composed of the marine guard and several of the junior and warrant officers, who sleep and mess here, but they were all driven elsewhere by the extreme heat and by the lack of air. Fortunately the weather was fair and dry, so that the dislodged occupants of this part of the ship could sleep on the main deck under the awnings. If the weather had been at all rainy, or even if there had been the slightest sea running, forbidding the use of the deck, it would have been very difficult to find room for so many men in a vessel already crowded.

The following table gives the temperature in the citadel and in the open air, taken twice a day:

Date and place.	9 a. m.		9.20 p. m.	
	Citadel.	Open air.	Citadel.	Open air.
	° F.	° F.	° F.	° F.
January 21, at sea	105	74	102	79
January 22, at sea	111	77	108	81
January 23, at sea	108	83	111	86
January 24, Acapulco	111.5	87	106	86
January 25, Acapulco	109.5	83	106	87
January 26, Acapulco	107.5	84	107	84
January 27, Acapulco	106	82	107	86
January 28, Acapulco	105	80	108.5	78
January 29, Acapulco	110	79	100	78
January 30, Acapulco	104.5	77	97	78
January 31, at sea	105	84	111	86
February 1, at sea	113	84	105	85
February 2, at sea	105	83	103	78
February 3, at sea	101	80	105.5	75
February 4, at sea	103	71	103	76

This record shows the unsatisfactory condition which exists in this part of the berth deck—and this, it must be remembered, when the temperature of the outside air was not excessively high and the weather clear and pleasant. In the rainy season in the same latitudes the condition would probably be much worse.

On the return of the ship to San Francisco I addressed a letter to the commanding officer, calling attention, at considerable length, to the extreme heat in these parts of the ship, and to the faulty position of the outlet of the after main air duct. Some changes have been made by cutting openings in the ammunition hoists, which will probably improve the ventilation of the citadel, and perhaps make it sufficiently cool for habitation in warm weather. Nothing has been done to improve the condition of the ammunition passages on the orlop deck, and the air duct still continues to draw air from the engine-room hatch.

Crew's quarters.—Aside from the citadel, the other quarters for the crew, namely, those on the forward berth deck and on the main deck in the superstructure, are cool and well ventilated. They are by all odds the most comfortable parts of the ship when at sea.

Officers' quarters.—The quarters for the officers when the vessel is under way are not so cool and well ventilated as could be desired. The hatches leading to the main deck are usually battened down, as even very moderate seas wash over the deck fore and aft. At these times there is no natural ventilation, the hot air is drawn back from the overheated citadel, and there can be no supply of fresh air, owing to the faulty position of the outlet of the air duct of which I have already spoken.

Fire rooms and engine rooms.—These very important parts of the vessel are quite warm, the temperature occasionally rising to 130° and even higher, but they are well ventilated and no cases of prostration from heat have occurred. A very fair test of the ventilation was obtained on the passage to Mexico, when the ship was eight days at sea, half of that time in the Tropics, and no ill effects from heat were observed among any of the engineer's force, among whom were many untried men.

SICK QUARTERS.

The experience of the last year has only shown more clearly the faulty location of the sick bay so far forward, almost in the extreme bows of the ship. It is very noisy in port and scarcely less so at sea, with the water almost constantly breaking over it. Here, too, the motion of the ship is most marked. The natural light is meager, as outside of one of the air ports is hung a catamaran, and the column supporting the billboard for the anchor shuts off much of the light from the second port. The dampness in the sick bay is excessive, and on several occasions the wet and dry bulb thermometers have shown saturation. As I wrote a year ago, the cork paint, which is used to prevent the condensation of moisture on the side of the ship, does not work either in the extreme bow or stern of the ship. The side of the ship in the sick bay is often so damp that water falls from it, and at times enough collects to require mopping up. It is impossible to keep instruments in the sick bay, as they soon rust. The same condition of humidity prevails in the adjoining dispensary.

During the month of August the average humidity taken every morning at sick call was 91, and in September it was 93. This was in the dry season of the year, when no rain fell at all. Fortunately the storeroom is dry and well fitted for its purpose in every respect.

WATER-CLOSETS, BATHROOMS, AND PANTRIES.

I have grouped together these somewhat incongruous subjects, as they possess one common feature—the removal of the waste—which on the other vessels of this class appears to have given much annoyance. On the *Oregon*, owing to the wiser arrangement of these very necessary facilities, no trouble has been experienced.

The closets for the officers are placed on the main deck, are constantly flushed with an ample supply of salt water, and are as free from odor and as clean as any part of the ship.

The closets for the men are also constantly flushed and are kept in good condition. The urinals, however, do occasionally have a strong ammoniacal odor, and I think it would be well to substitute for the present pattern a long porcelain-lined trough.

The various bathrooms, although on the berth deck, have the tubs raised above the floor, so as to give a sufficient fall for discharging the water quickly. The drains of the washrooms and pantries also lead directly overboard.

By these arrangements the use of tanks to receive waste water is rendered unnecessary and the difficulties which have been experienced on the *Massachusetts* and *Indiana* have not occurred on this ship.

WATER.

The evaporators supply about 4,000 gallons of water a day, and for the greater part of the year no shore water has been used. The quality is not so good as could be desired, being inferior to that I have usually seen on our ships, and it always contains salt. No evil results have followed the use of the water, and intestinal troubles have been very few and of a simple character.

I am informed that the presence of the salt is due to the faulty position of the evaporator and distiller, which are practically on the same level.

FOOD.

The food has been of good quality and ample in amount. It is, as a rule, well cooked, and I do not remember any crew who has on the whole lived better than the one of this ship.

Quite recently a committee of the men have started a sort of canteen. They purchase in large quantities the articles usually sold in the bumboat and retail them to the men. Better articles are obtained at a smaller cost, and the exorbitant profits of the bumboat men are avoided. Whatever profits may accrue are to be devoted to the voluntary band supported by the men, to athletic sports, and other like purposes. No beer or other stimulants are sold. Thus far the plan has worked well.

CARE OF THE WOUNDED IN ACTION.

The facilities provided for transporting the wounded in time of action are not good, and the places designated for their reception and treatment are inadequate.

The sick bay is in the extreme forward part of the ship, where there is no armor protection at all, and where any occupants would practically be as much exposed as if they were on deck. In time of action this part of the ship is to be entirely abandoned. When the heavy battle hatches are on and the armored doors closed, there is no access to it from any part of the ship.

There has been designated for use as hospital in time of action a place in the after end of the citadel on the port side. The space is limited, and a dozen men seriously injured would overcrowd it. Apart from its very inadequate size it is as good a place as could have been selected, and in truth is the only one available. It is fairly well protected and is immediately contiguous to the junior officers' lavatory, with its supply of water. The supply of natural light is very scanty, and in the case of any interference with the electric light, a not improbable contingency, it would be difficult to perform even slight operations.

Here at general quarters, when the ship is cleared for action, is the station of the surgeon and his assistants, and here are brought the instruments and all the necessary appliances, both medical and surgical, from the dispensary and storeroom, which are at the other end of the ship, and are at this time quite inaccessible. The only direct means of communication between this hospital and the men at the guns is through one small hatch in the main deck, at the after end of the superstructure. This hatch is at quite a distance from the battery, and wounded men would have to be carried through a narrow passage and two doorways, and then must be passed down by hand, or in a chair, as the opening of the hatch is too small to permit the use of an ordinary cot or any of the other devices which can be employed on a cruiser. There are two other hatches which can be utilized to a limited extent, but they are quite remote and can only be reached by going through several narrow passages and doorways. These passages are in places tortuous, so that it is difficult to carry a man in an ordinary cot or stretcher. This difficulty was noticeably shown in the case of a man with a fracture of the patella, who had to be conveyed from the engine room to the sick bay over essentially the same route as would have to be employed in action. Probably in practice the wounded would have to be carried in the arms to the most convenient hatch, there let down and taken in the arms of assistants to the hospital. In this unsatisfactory manner those wounded at the secondary battery and at the VI and VIII inch guns might be transported.

For those in the XIII-inch turrets the facilities for treatment are still worse. The wounded would have to be lowered to the base of the turrets by means of the ammunition hoist, where the only places to put them are two small athwartship passages. Fortunately the occupants of these turrets are exposed to less risk of injury, being so well protected, than the other men at the guns.

We have rather meager facts upon which to base an opinion as to the number who would be disabled in action. It is not improbable that so many would be wounded early in the action that none of the uninjured could be spared to carry those seriously hurt to the hospital, as it would require at least two men to carry each wounded man who could not walk. Those not wounded must stay by their guns, rendering on the spot what little aid they can to their wounded mates. A certain amount of aid will also be given by the surgeon and his assistants going from place to place; but, on the whole, I think that the conditions on a modern man-of-war in time of action will not materially differ from those on the battlefield, where those seriously wounded must wait until the battle is over or a temporary lull occurs.

SUMMARY OF THE CRUISE.

During the year the ship has been in the ports of San Francisco, Acapulco and Magdalena Bay, Mexico, the principal towns in Puget Sound, and Victoria, British Columbia. San Francisco, where the *Oregon* has spent a little over half the year, was spoken of sufficiently in my last report and is too well known to require further notice.

Acapulco is situated on the west coast of Mexico, in latitude 16° 50′ N., well inside the tropics. It possesses a fine landlocked harbor, one of the very few on the Mexican coast, and to this circumstance owes its comparative importance, as the surrounding country is not fertile and communication with the richer districts of the interior is over rugged mountains. The town itself contains only about 5,000 inhabitants, and the surrounding country is but thinly settled and produces little except fruit of the usual tropical varieties and of rather indifferent quality, aside from the limes, which are sent to San Francisco. There is a garrison quartered here, and connected with it is a small military hospital. Our visit was in the dry season, and the place was very free from disease of any kind. In the rainy months of the year malarial diseases prevail, but not so severely as in many other ports on this coast, as there is only a comparatively small area of low swampy country in the immediate neighborhood. In the immediate vicinity of the town it is quite hilly and rocky. Yellow fever is an occasional visitor, but there have been no severe epidemics of this disease for years. The water supply is scanty and the quality very indifferent. Other supplies can be obtained of fair quality, and the drug store appeared to be well stocked.

The weather during our short stay was dry and fine, and the temperature not excessive, occasionally reaching 90° in the heat of the day, but for most of the time ranging several degrees lower.

After leaving Acapulco the *Oregon* stopped on her way north for a few days at Magdalena Bay, on the west coast of Lower California, in latitude 24° N. The bay is fine and large, well protected by low mountain ranges, and an excellent place for target practice, the only reason why it is visited. The surrounding country is mountainous and very barren, producing nothing of any value except archil, a variety of lichen used as a dye and which is collected to some extent for export. The climate is dry and the rainfall very small. The waters are more productive than the land, and teem with excellent fish and turtles.

There is a small settlement of a dozen houses and a population of about 50, mainly Indians, who obtain a frugal living from the sea and the sale of the archil they gather. No stores of any kind can be obtained, and the inhabitants take advantage of the arrival of a ship to secure treatment, medicine, and in fact anything they can get.

The weather during our stay was clear and bracing from the fresh northwest wind which prevailed almost constantly, and the temperature was 68° to 70° in the daytime.

Puget Sound, in which the vessel has passed between four and five months of the year, is in many respects the finest inland sheet of water on the continent. Its large expanse, great depth of water, a climate temperate the year through, and the beauty of the mountainous shores combine to make it a most attractive region. The busy cities on its banks are now enjoying a more natural prosperity than they ever possessed, and the rapidly increasing commerce goes far to justify the claims of its people that here are to be the great marts of our western coast.

The sound proper commences at the eastern end of the Strait of Juan de Fuca, about 100 miles from the ocean, and extends south for about the same distance, with numerous bays, inlets, and arms running into the land, for the most part on the west side, and the total area of its waters is not much less than 2,000 square miles, practically all of it being navigable.

Nearly opposite Seattle, about 35 miles from the mouth of the Sound, one of these arms runs into the land, and after a tortuous course of about 5 miles it widens into a broad bay over 2 miles long and half as wide, surrounded by high hills rising quite steeply from the water. Upon the north shore of this bay has been located the Puget Sound Naval Station. The site on the whole has been well selected, the principal disadvantage being the comparative remoteness from any large town. It is a dozen miles from Seattle, and the sole means of communication is by means of small steamers, and owing to its position on the western side of the Sound it will probably be many years before any railroad will be carried through the mountainous and thinly settled country which embraces the whole of the western part of the State lying between the Sound and the ocean. The station takes in about 200 acres, stretching along the shore for a mile and a quarter, and being consequently quite narrow. Its general direction is nearly east and west, and at each extremity there is a stretch of comparatively level land, while the middle is quite uneven, rising gradually to a height of over a hundred feet. The general contour is quite uneven, as there are several small valleys running down to the bay. The whole station faces to the south, and the residences on the hill side command a fine view of the Cascade and Olympic ranges with Mount Rainier in the distance.

The soil is glacial drift with occasional bowlders of granite, and is covered on the surface with a thin layer of humus resulting from the decomposition of the forests which clothed this region. Underlying the superficial layers of gravel are strata of clay and sand. From the character of the soil and the quite steep slope of the land the drainage is excellent, tending naturally toward the bay. Less than a decade ago the site of the station was quite thickly wooded, for the most part with trees of moderate size, according to the Western standard. Most of the valuable trees, however, were cut away a generation ago. At the present time much of the reservation has been quite well cleared, especially of the undergrowth, and the slopes are being rapidly graded and grassed over. The western half of the station away from the dry dock shops, and residences is still quite thickly covered with trees of no mean size. The majority are members of the pine family (spruces, firs, hemlocks, and cedars), very few of them being true pines. The most striking of them is the Douglas fir (*Abies douglassii*), the source of the so-called Oregon pine. Occasional trees of this species in the virgin forests reach the height of 300 feet, and those of 200 feet are very common. In one of the parks near Seattle, where fortunately quite an area of the original forest has been saved, there is a fir which has a circumference of 41 feet, and the tree is still sound and healthy.

The deciduous trees are much less numerous than the conifers, but on the station and in the immediate vicinity are to be found willows, maples, cherries, and alders, none of them of much size or beauty and inferior to those on the Atlantic coast. The madrona (*Arbutus menziessii*) attracts the attention at once from the striking red-brown bark, and the large shining leaves, not unlike a magnolia, which persist all through the winter. It is a member of the heath family, which I have found well represented by numerous varieties of whortleberries, bearberries, and wintergreen, quite different from the same genera in the East, and many of them having evergreen foliage. During the time of our first visit to the station in early spring I took much pleasure in examining its flora, and in noting both the resemblances and differences of the genera common to the Atlantic and Pacific coasts.

The climate of this place is quite equable and there is neither extreme heat in summer nor great cold in winter, the average temperature for the year being about 50° F. The rainfall is considerable, being about 53 inches, and occurs mostly in the winter and early spring, the rest of the year being fair and dry. The little snow which falls soon melts.

Even in the damp months of winter the place is not unhealthy, and, as far as I could ascertain, bronchial and rheumatic affections are neither very common nor severe. Certainly during the month of December, almost all of which we spent in Puget Sound, the health of the crew was excellent, although the men were exposed a great deal, and the rainfall for that time was 11.73 inches.

The water supply of the station is obtained from two springs which have been dug out, walled, and covered, and is pumped to iron tanks built on the highest part of the reservation, thus insuring a good head of water. While at present the supply is sufficient in quantity, and of good quality, it will in the not distant future probably be unsatisfactory in both respects. The watershed is of small area and every day is becoming more contaminated as the land is cleared and settled. I think within a few years the water will be unfit for drinking purposes. Fortunately there is a small lake about 3 miles away which can be utilized as a source of supply. As I have already stated the drainage of the station is excellent as there is a steep fall to the waters of the bay. A small hospital is much needed here, as the nearest civil hospital is 12 miles away, and the present means of communication are poor. During the spring there was a mild epidemic of measles on the *Oregon.* Three cases were sent to hospitals, and eight occurred after our arrival at the station. It was deemed very imprudent to retain them on the ship, as it would have been impossible to isolate them satisfactorily.

Fortunately there was a small building in the yard, originally used as the office of the civil engineer, which was conveniently located to the dock. It was entirely bare of furniture, and there was none on the station; not even a chair could be obtained. In a few hours rude bedsteads, tables, and benches were made, and other necessary articles were brought from the ship. The two patients suffering with measles and one of the bay men were transferred to the hastily extemporized hospital, and it was continuously occupied for six weeks. Food and all other articles were carried from the ship, and in spite of many inconveniences the sick did very well. The disease was kept within reasonable limits, there being only 11 cases in all, a number which I think would have been much exceeded if it had been necessary to retain the sick on the ship. Fortunately, the weather was fine, or the inconveniences would have been much increased. All the water for domestic purposes and for disinfecting clothing and bedding had to be boiled over a fire built in the open air, the kettle being supported on a few bricks. The closets were in a rude building nearly 50 feet away, and the water supply was over twice as far. In the stormy and rainy weather of winter and early spring it would have been extremely difficult to maintain the place.

I have spoken on this subject at some length to show the necessity for a small hospital, fitted with even the most modest supply of furniture, such as a few iron bedsteads, tables, chairs, and a stove on which water could be heated in larger quantities than a quart at a time. The building we used is not badly adapted for the purpose, and the expenditure of $500 would be enough to bring in water and build a simple closet in the rear, and the same amount would supply enough furniture for a dozen patients, while the attendants could be provided by the visiting ship. A short stay was made at Seattle and also at Tacoma, the two largest cities on the Sound. These places are well known and have been frequently described by medical officers. In each place there are excellent hospitals where patients can be sent and treated at moderate rates.

Port Townsend, at the entrance of the Sound, is a much smaller place than either Seattle or Tacoma, but is a town of some importance as the port of entry for all the Sound. There is a good-sized marine hospital of recent construction situated here, and two of our cases of measles were left here when we first arrived.

Port Angeles, the only other town we went to, is on the Strait of Juan de Fuca, a little over 50 miles from the ocean. The harbor is an excellent one, possessing a most remarkable natural breakwater, and is frequently resorted to as a port of refuge. The town at present is quite small, the population of 4,000 which it had five years ago having dwindled to 1,500. The climate is healthy and the soil productive for the hardier vegetables and fruits. There is no hospital or other accommodation for patients, who would have to be sent to Port Townsend. We were kindly invited to participate in the celebration of the Queen's Jubilee at Victoria, British Columbia, and were at the naval station at Esquimalt for a week in June. Here the British Government has a small but well-equipped dockyard, in which there is a naval hospital, under charge of a surgeon, for the reception of the sailors and marines of the squadron.

At the time of our visit the place was very attractive, not only on account of the various festivities taking place and the generous hospitality shown us, but also from the delightful weather which prevailed. Although so near our own ports, there is quite a distinctive foreign air about Victoria and a marked resemblance with the many English colonies scattered all over the world. Owing to our short stay and the many claims made upon our time, I had scant opportunity of making any satisfactory observations of the place. The climate is rather more severe than in Puget Sound and the products of the soil still fewer. Owing to the comparatively cool temperature, practically no grain of any kind can be grown and most of the food stuffs, except the various roots, have to be imported.

The vegetation seems to be decidedly less luxuriant than on the American shores, and none of the majestic conifers were observed which are so common on the opposite side of the strait. The trees are noticeably smaller, and the deciduous trees, such as oaks, alders, and birches, decidedly more common. This is, perhaps, due to the soil being so much thinner, as ledges of rock are everywhere seen coming to the surface. The general characteristics of the country are very similar to those seen on the coasts of Maine and Nova Scotia.

From conversation with the medical officers of the British navy whom I met, I should judge that the various bronchial and rheumatic affections are more frequent and severe at Victoria than in Puget Sound, due, not unlikely, to its being so much more exposed to the moisture-laden winds from the south.

In addition to the sick quarters in the dockyard at Esquimalt there are two hospitals in Victoria.

In the following table I have condensed the quarterly reports of this vessel, so as to show readily the prevailing affections:

Diseases.	Remaining from previous year.	Admitted.	Readmitted.	Discharged to duty.	Transferred to hospital.	Discharged from the service.	Continued to the next year.	Sick days.
General infectious diseases	1	37	3	33	8			329
Constitutional disorders of nutrition		1		1				1
Disorders of the nervous system		10	1	7	3	1		58
Disorders of the visual apparatus		4		3	1			38
Disorders of the auditory apparatus		1			1			1
Disorders of the olfactory apparatus		1			1			2
Disorders of the digestive apparatus		19		19				76
Disorders of the circulatory apparatus		2	1	2	1			36
Disorders of the respiratory apparatus	1	33	2	33	3			194
Disorders of the motor apparatus	1	6	2	7	2			49
Disorders of the cutaneous apparatus		21	2	22	1			147
Disorders of the genito urinary apparatus		22	3	22	1		2	187
Injuries		62	3	60	4		1	472
Poisons		13		13				31
Total	3	232	17	222	26	1	3	1,621

Rather more than one-quarter of the cases under treatment and nearly 30 per cent of the total sick days were due to injuries of various kinds. The majority were of no severity and such as are certain to occur on a vessel where there is so much machinery and so many projecting surfaces of iron to strike against. The few cases of any severity have been already described in the quarterly reports, but will perhaps bear a slight notice here.

A rather uncommon case was a compound fracture of the superior maxillary bone. The man while at work in the dry dock was struck in the face by a heavy block of wood, driving in the floor of the orbit and also inflicting quite extensive lacerations of the soft tissues both above and below the eye. The wounds healed without suppuration, and the resulting deformity is very slight. A case still under treatment is a compound fracture of the fifth toe and metatarsal bones of the foot with quite extensive laceration of the soft tissues. Two fractures, one of the clavicle and one of the wrist, were received while the men were ashore, and presented no unusual symptoms.

A severe injury of the eye was received at target practice by a man who was struck by a fragment of an electric primer, which pierced the sclerotic and embedded itself in the deeper tissues. Vision was at once lost, and later the eye was removed at the Mare Island Hospital.

To general infectious diseases are due 329 sick days, or nearly 20 per cent of the total number. A mild epidemic of measles accounted for many of these. It developed in a man who had been enlisted only a few days, and this case was followed by ten others. Three men were sent to hospitals at Mare Island and at Port Townsend, and the remainder were treated at the Puget Sound Naval Station in the building I have already described. There were no unusual symptoms present in any case, and all made an excellent recovery.

Four cases of chronic tubercular disease of the lungs have occurred. They were all in men who had been in the service for several years, and I do not think originated on this vessel.

There were 18 cases of malarial affections, all mild, and none could be traced to exposure while serving on the *Oregon*.

Disorders of the air passages account for 35 cases and 194 sick days, a much smaller number for the whole year than occurred in the six months of 1896 the vessel was in commission.

As the *Oregon* was in the same ports and exposed to practically the same conditions during these two periods I think the much smaller prevalence of these affections confirm the opinion I expressed a year ago that their comparative frequency at that time was due in great degree to the ignorance and carelessness of the younger members of the crew who were now for the first time living on a ship. From my experience on this coast I am led to believe that persons arriving in San Francisco in the foggy, damp months of summer and early autumn are almost certain to have some affection of the respiratory apparatus, then become acclimated and acquire a considerable degree of immunity. This is true both of those coming from the East and the dry regions of the interior of the State.

Genito-urinary affections gave 25 cases and 187 sick days. They have all been comparatively mild and presented no unusual features. But one man required transfer to the hospital and he had quite a severe case of gonorrheal rheumatism.

The very small number of cases affecting the digestive apparatus is quite noticeable, and the majority of these were tonsillitis and pharyngitis. The ordinary disorders of digestion were almost entirely absent. The 13 cases of poisons were all of alcoholic origin.

On the whole the health of the crew has been excellent, and there has been little or no disease which could be attributed to unfavorable conditions on the ship.

There have been no deaths during the year. During our last stay in San Francisco a dentist came off to the ship, and worked several days a week for nearly three months. Many men took advantage of his services who otherwise would probably have neglected their teeth. I think that in the case of the apprentices it would be an excellent plan to have their teeth examined and treated at stated intervals. Much suffering would be prevented and there would be fewer men presenting themselves for reenlistment with teeth so bad that in a person applying for the first time it would be a sufficient cause for rejection.

There have been 120 persons examined for the naval service; 56 were accepted and 64 were rejected, 3 being for color blindness.

There have been 47 persons vaccinated, who remained on the vessel long enough to ascertain whether the result was successful. In 14, or 29.9 per cent, this was obtained.

REPORT ON THE U. S. S. TERROR.

By Oliver Diehl, *Surgeon, United States Navy.*

The general health of the officers and crew of this vessel, during the past year, has been exceptionally good.

Injuries, mostly trivial, make up a large proportion of admissions, and it is a cause for congratulation that not a single case of sickness has occurred which can be directly traced to any avoidable insanitary condition on board ship.

Most of the time was spent in port, principally at New York, Charleston, S. C., Philadelphia, and Hampton Roads and vicinity. The months of May, June, July, and August were spent in the Wallabout basin at the New York Navy-Yard, while undergoing repairs. The continuous warm weather while there, with insanitary surroundings, was sufficient cause for disease, but it was probably prevented by constant watchfulness and untiring efforts to promote the comfort and welfare of the crew. The daily average temperature during this period, in the superstructure at 8 a. m., was 82.5, and decidedly higher during the day. The water in the Wallabout basin is notably foul, preventing the men from bathing. As a substitute, a hose, provided with a rose nozzle, was fitted up on the deck and the men encouraged to use this improvised shower bath. At night the crew were allowed to sling their hammocks in the open air, sheltered merely by an awning overhead. Temporary movable water-closets, surrounded by canvas, were fitted overboard from the forecastle for the use of the crew. The blowers were run to their full capacity and disinfectants liberally used, wherever indicated.

The construction, arrangement, ventilating system and other details of the *Terror* have been so thoroughly described by my predecessor that repetition is considered unnecessary. I deem it well, however, to mention the changes made in the way of sanitary improvement, and to call attention to some still existing defects.

The question of ventilation, temperature, illumination, and drainage, considered of such importance in dwellings on shore, becomes especially so in the model battle ship, and above all in the *Monitor* type. Here the conditions of life are about as unnatural as they can well be, especially at sea. Ventilation and illumination are entirely artificial. On account of the low free board the open air space is greatly contracted, and in warm weather the steam plant soon heats up the ship to an almost unendurable degree. It is therefore obvious that short cruises, avoidance of extremes of temperature, and intelligent utilization of the ventilating and illuminating plants will conduce greatly toward good health of the personnel.

VENTILATION.

The ventilating system of this ship has proved very satisfactory with the entire system in operation. An abundant quantity of fresh air is supplied to the storerooms and living spaces. The air as it comes from the blowers is, however, generally loaded with dust, which could be obviated by placing dust screens or filters along the course of the supply tubes. Furthermore, during cold weather it is often too cold for comfort. On this account registers are often surreptitiously closed and the air supply diminished. The temperature of the air could be raised by passing it over warm steam pipes before distribution.

The ventilation and temperature (which has risen to 138° F.) of the engine room has been greatly improved by placing a sheet-iron ventilator in the superstructure, leading from an opening directly above the engine-room platform to the open air above the superstructure deck.

The temperature on the berth deck, around the dynamos, and in the after turret chamber was also reduced in warm weather while in port by putting the ventilators originally provided for this purpose in place. Electric fans placed in various parts of the ship have also greatly contributed to comfort, and the number has recently been increased so that every stateroom now has one. There is, however, one compartment which is still insufficiently ventilated and this, added to the high temperature, makes it practically uninhabitable for any length of time. This is the forward compressor space, situated forward of and opening into the adjoining fire room. It contains one of the two compressors used in connection with the pneumatic system operating the turrets and 10-inch guns. This space is unprovided with any adequate ventilating arrangement or means of reducing the temperature raised, not only by the heat from the mechanism itself, but from the proximity of the fire room, where the temperature has risen to 132° F., and where several cases of heat prostration have occurred. This space is provided with electric blowers, but these are inadequate and often out of order. Fortunately it has never been necessary to depend upon this compressor alone; but during action this might become necessary, and on account of the high temperature, which would be much higher than has been observed in the fire room, a relay of men would probably be necessary to attend the mechanism, thus possibly impairing the efficiency of the guns and vessel.

ILLUMINATION.

This is generally satisfactory except occasionally during turret drill and with reduced boiler power when the additional steam required to operate the pneumatic system necessarily reduces the voltage. In ships of this type none but the electric light should be used and the plant worked to its full capacity whenever practicable.

WATER-CLOSETS, WASH AND BATH ROOMS.

An important improvement has been made in the method of draining the closet spaces used by the crew. Previous to this change the drippings and overflow from the urinals, the waste water from the shower bath and from washing out the spaces, drained into the bilge. This was remedied by plugging the drainpipes, raising and regrading the cement floors, and leading the waste water outside, through openings in the superstructure where it can be carried through a movable trough over the ship's sides. This was, however, the only improvement made. The objectionable system of closets and the small metallic urinals in the men's heads have not yet been replaced. The same objections apply to the fixtures in the closet space used by the officers. On account of the unavoidable varying pressure of the flushing pumps, the closets are constantly out of order, the valves and drain pipes frequently leak, requiring the constant services of the plumber. A reflux of sewage and escape of foul odors is frequently noticed. This reflux was frequently noticed in the urinal and wash basin, and an examination revealed the fact that the drainpipes from these two fixtures were connected with the drainpipes from the men's heads and with the overflow from the flushing tanks in such a manner that any extra force from the pumps filling the flushing tanks caused a reflux of sewage into the urinal and wash basin. This was occasionally sufficient in amount to overflow onto the deck in this space and was washed into the bilge through the drainpipe which drains this space. And even in the absence of sewage the drainpipes from the urinal and basin, being improperly trapped, served as a vent to the drainpipes from the men's head, thus menacing the health of the crew, a large number of whom berth in the adjacent superstructure.

This defect has been temporarily remedied by putting the urinal and basin out of commission, plugging their drainpipes, and leading the overflow pipes from the flushing tanks outboard into the scuppers. But the officers are at present without a urinal.

The closet spaces for officers are very contracted. As the wash basin is at present out of commission, and is never used when in working order, it might be replaced by a new urinal and additional closet space secured, much to the comfort of the officers. Attention has frequently been called to these defects in the water-closet system, and as most of the bowls are cracked, the flushing system unsatisfactory, and the head without a urinal, it would be well to remove the present fixtures entirely and replace them by some new, continuous flushing system. The drain leading into the bilge should also be closed, as was done in the men's head.

The crew, averaging 140 men, are provided with no bathing facilities, except one shower bath located in the starboard head and one in the firemen's wash room. The former is totally inadequate, and, on account of the contracted space, interferes with the use of the closets, so that it is used by a very small proportion of the crew. No change has been made in the methods of draining the firemen's wash room. The question of collecting the waste water into a tank instead of draining it into the bilge has been considered, but as the tank would probably be difficult of access for proper cleaning, and might in its turn become objectionable and a menace to health, the question is still in abeyance.

WATER.

While at the New York Navy-Yard, water for drinking and cooking purposes was obtained from the Brooklyn city supply. With this exception it has all been distilled on board. The distilling apparatus is of the pattern supplied by the Bureau of Steam Engineering, is connected with a Baird (charcoal) filter, but is unprovided with any arrangement for rapid aeration. There is no separate boiler, nor feed pipe for distilling, one of four main boilers being used indiscriminately for this purpose. The ship is only provided with six water tanks, with a total capacity of 2,568 gallons. As this quantity is generally consumed in four days, the time for natural aeration and oxidation is short and the water occasionally unpalatable.

BRIG.

Until recently this ship was unprovided with a cell, prisoners being kept on the berth deck. A stateroom formerly assigned to the master-at-arms, at the forward end of the port wing passage, was converted into a cell, and is admirably adapted for this purpose. It is well ventilated, being supplied with both supply and exhaust air registers. Dimensions are 7 feet 3 inches by 3 feet 8 inches. Height between decks, 7 feet.

STOREROOMS AND BILGES.

With the exception of the paymaster's and wardroom storerooms, they are generally clean, dry, and well ventilated. The two mentioned, being beneath the after compressor, receive the drippings from it, which leak through the deck. This compressor is fastened directly to the deck, which, not being properly calked and being inaccessible for proper cleaning, oil and water accumulate beneath the compressor, and might become a nidus for disease germs if the ship should remain for any length of time in a hot climate.

The bilges are generally sweet and clean. A shallow place amidships under the fire-room plates can not be thoroughly emptied by the pumps. This space is usually wiped out by hand and a disinfectant solution liberally used.

Eight of the double-bottom compartments in the after end of the ship are only accessible through the after wing passages running between the fore and aft wardroom and cabin bulkheads and sides of the ship. These passages are reached by openings in this bulkhead in the two forward and two after wardrooms and in two of the cabin staterooms. Whenever these compartments are cleaned, or repairs to electric wires or switches in the wing passages made, the men detailed for this purpose have to climb over the bunks in these rooms, and the accumulations of water and dirt are removed in buckets through the the same openings, greatly to the discomfort of officers occupying these rooms. This could be obviated by cutting a manhole through the transverse bulkhead which separates the wardroom from the space forward of it. Access to the wing passages could then be obtained directly from the berth deck.

BERTHING SPACE.

This remains the same as noted in the last report except on the berth deck, where it has been slightly reduced by the installation of a steam lathe and drill.

STATION IN BATTLE.

The main station of the medical officer during an engagement would be in the wardroom. As is the case in most of the modern battle ships, the narrow passages with sharp turns would interfere with rapid and safe transportation of the wounded to the main station of the surgeon. The first aid to the wounded in the forward part of the ship would devolve upon some of the crew stationed here. To meet such an emergency the crew have been well drilled in the use of the tourniquet and other methods for controlling hemorrhage and overcoming shock and instructed in the proper method of handling and transporting the wounded. Further measures have also been recommended as follows: Hammocks to be provided at general quarters for transporting the wounded and a small box containing tourniquets, stimulants, and dressings will be provided for each division as soon as they can be made. This box is to be kept in the sick bay and to be called for by a person especially detailed, who will be responsible for its return in good condition; the boxes to be inspected as soon as they are returned and contents kept ready for instant use.

From the nature of construction, the monitor is necessarily a "wet" ship; but some of the insanitary effects of wet and dampness could probably be obviated on the *Terror* by changing the present arrangement for carrying off the water which leaks in at sea between the main deck and turrets. As arranged at present, this water is collected by a trough running around the turrets on the under side of the main deck. These troughs are drained into the bilge by two 2-inch pipes which meet and empty into a drain pipe of the same diameter. In a heavy sea the water accumulates very quickly in the trough and, not being carried off quickly enough, runs over the top, keeping the berth deck constantly wet. A different pitch of this trough with additional drain pipes of larger caliber might obviate this defect.

REPORT ON THE U. S. S. BENNINGTON.

By JOHN W. BAKER, *Surgeon,* and E. P. STONE, *Passed Assistant Surgeon, United States Navy.*

REPORT BY SURGEON JOHN W. BAKER.

The beginning of the year found the *Bennington* at Jiquilisco Bay, Salvador, where she had arrived the previous December, engaged in a survey of those waters.

While engaged in that survey the crew was divided into two working parties, each taking alternate days at the survey, going out in the boats sounding or building signals in the mangrove mud and water, necessarily much exposed to malarial fevers. While one portion of the crew was thus engaged in surveying work, the remaining half of the deck portion was engaged in thoroughly overhauling the ship. It was not considered advisable to work the crew in the heat of the day; accordingly they commenced their work at 6 a. m., after a hearty breakfast, and five grains of quinine given to those working in the mangrove mud. At 11.30 they were back to the ship again, and after dinner were allowed their hammocks until 2.30 p. m., when they returned to their work and came back at 6 p. m. This gave them their work during the early and later portions of the day, with a good rest during the hottest part. There is a great deal of malaria in this region, more especially from May to October, the rainy season. During that time of the year many cases of the pernicious type occur, and it is difficult to retain at the new port of El Triunpo the services of a physician. The natives, a mixed race, who live on the borders of the estuary and who come during the dry season to catch and cure fish, are mostly affected with intermittent and remittent fever, and many carry about with them spleens of large size. They came every day, sometimes a large canoe full, with patients ranging from 4 to 70 years old, and nearly all were made well with quinine and arsenic in pill form, liberally administered. An attempt was also made to instruct them in preventive medicine, by telling them the necessity of first boiling their water for drinking purposes. This is not a difficult thing to do, as they have firewood in abundance and almost all of them keep a bright fire burning through the night to frighten away the jaguars, two specimens of which were shot during our stay here. Whether our efforts were successful or not I can not say; the results attained were certainly pleasing, and the demand for quinine fell off.

Round worms and the tæniæ are found here in abundance, and Santonin in pill form, male fern, ether, and chloroform in emulsions had the desired effect.

The temperature is very steady all the dry season, extending from November to May, and, with the exception of a few rain squalls during the last week of our stay, there had been no rainfall since our arrival. The sun would rise in a cloudless sky and shine bright and hot on the luxuriant vegetation on the lowlands and islands of the bay, and the temperature would range generally from 80 to 85 under the poop deck well sheltered from the sun. In the month of April there was very little difference between the day and night temperatures aboard ship, it frequently being as warm at midnight as at noon. I mean, of course, shade temperatures. But there is no question of the enervating effects of this climate on European residents here as well as upon our own crew. This was especially well shown in the engine-room force when we came to leave. For, though they were anxious to labor as was their wont, the depressing effects of the climate were only two well shown in the absence of muscular vigor and the loss of nervous energy. No ship, except for very urgent reasons, ought to remain so long in such a climate, and it is to be hoped the necessity for so doing will not again arise. In case it should, it would be well to send a ship that could dispense with the use of distilled water in her boilers, devoting what time the distiller was actually in use to the manufacture of water for drinking purposes only.

The after berth deck was simply uninhabitable by the men, who were allowed to sleep on the poop, quarter-deck, anywhere, so long as they kept under the awnings. No ill effects were experienced, it seems, from what might be termed exposure to night air. In order to avoid as far as possible the use of the distiller, which played an important part in the manufacture of heat, water for the use of the boilers and for washing purposes only was brought from a well dug by our crew, and it is, of course, perfectly possible that malaria may have thus been introduced aboard ship.

Certain changes should be made in this ship when opportunity offers which would add much to the comfort, if not the health of the crew. In the first place, the quarters now assigned junior officers and temporarily assigned by the commanding officer for use as a sick bay and dispensary should be permanently set apart for such use, thus giving the sick a place where they can secure rest, quiet, and be near the quarters of the medical officer, which is especially important in a small ship constructed like this, where in rough, stormy, or rainy weather the only way forward is along the two side passages between the coal bunkers and engine rooms, and which are crowded with men in hammocks and men on the planks at night and firemen and coal passers off watch.

The large hatch of the after engine room has had its purpose entirely defeated, so far as supply of fresh air and escape of foul is concerned, by building a solid and substantial bridge or platform over it, for the purpose of stowing all manner of deck gear, and is further obstructed in its useful purpose of ventilation by the two cutters which rest in their cradles alongside this platform. To still further cut off such air as might escape or enter the engine room, it would seem that a flying platform of oars and spars once connected the cutter with the permanent or large bridge. This has indeed been made permanent on the port side, and at present the engine room and machine-shop hatches are cut off from all fresh air. Arrangements should also be made whereby a larger supply of fresh air may be furnished the forward fire room. At present there are two large ventilators rendered perfectly useless by the pilot house having been built directly in front of them, and so far obstructing their use as to actually limit, by interference, movement of the cowls. Now, as the time an extra quantity of fresh air is most needed to supply the firemen and coal passers below is not in port but at sea, no valid objections from an æsthetic point of view could be made to continuing the ventilators by the adjustment of temporary extensions to any point desirable above the pilot house, and thus a large supply of good, cool, and fresh air be drawn in below when of all places in the ship it is most needed.

Dripping with perspiration, covered with coal dust, pores of the skin clogged with dirt, thus impeding the cooling effects of evaporation and largely reducing such surface, they stand inhaling the fumes of recently hauled or cleaned fires and fighting against the depressing effects of heat until their hearts refuse longer to impel the blood, and they are either artificially revived by stimulants which are furnished each watch or else are carried and led below to see the doctor. This is the history of each run at sea, and the entries under vertigo, prostratio thermica, febris thermica, syncope, and virium defectio, tell the story to all who may calmly and without prejudice study the history of such cases. A battle, the loss of a ship, or many lives may at any time hinge on the quick turning and effective handling of a ship, and no one will deny that plenty of steam is essential to all this. Abundance of steam and its maintenance require not only that fresh air shall be supplied to the fuel, which is provided for by blowers, but that good air, fresh air, cool air shall reach the lungs and envelope the skins of the men who are engaged far below, away from all the attendant and nerving excitement of the battle, in the struggle to keep their own temperature down and that of the fires up. The only way to meet this problem is to follow the methods pursued in arriving at results in general, namely, study and attention to detail. We should build our ventilators larger and higher and make them more numerous; provide our fire rooms, bunkers, and engine rooms with fans on a large scale, until we no longer are content that men should, in these days of modern science, toil and labor in a vitiated atmosphere at temperatures varying from 130 to 170, until they are temporarily exhausted or permanently disabled, and that, too, long before the period assigned to men who live on deck in fresh air and wholesome sunshine, and who are never called upon to make the physical exertion, save in unusual emergencies, that these men must make every day, if we would maintain our speed at sea, speed and turning in evolutions, in fact the efficiency that is not only desirable but absolutely essential for our success in warfare and for which our ships are constructed.

REPORT OF PASSED ASSISTANT SURGEON E. P. STONE.

The ship has spent 329 days in port and 36 days at sea. Most of the time in port has been spent at Jiquilisco Bay, Salvador, Mare Island, California, and Honolulu, Hawaiian Islands.

The case of Surgeon Baker emphasizes the advisability of sending two medical officers to any ship, no matter what her size may be, which is expected to stay for a long time in a notoriously unhealthy climate.

Surgeon Baker had a severe attack of malarial fever, running over a long period, with high temperature, often delirious at night; yet he was obliged to be up and about during the day, caring for patients, several of whom were seriously sick. The services even of the apothecary failed him, the apothecary being in confinement on serious charges, under which he was subsequently discharged. Surgeon Baker was obliged to compound his medicines and superintend the nursing as well as prescribe for his patients, at a time when he himself should have been in bed receiving careful nursing and treatment.

From two to four officers and an average of twenty men were on detached service at Pearl City, 12 miles from Honolulu, from September 1 to December 1, except for one week, when they returned to the ship for target practice. The party was making a survey of Pearl Harbor, performing all the hard work of building signal stations and running lines of soundings, exposed to the very hot sun, which prevailed here during those months. Pearl City is a small town, composed mainly of cottages belonging to citizens of Honolulu, who live there during the hot months. The officers were living in a comfortable cottage, situated on the shore; the majority of the men lived in an unfinished building, which was partitioned off into several rooms in which bunks were built; some of the men occupied tents. The men were located in an adjoining lot to the officers' cottage. Food supplies were sent down daily from the markets of Honolulu; the water used was the local supply from the reservoir up in the hills. The cooking for the men was done in the open air. The men attached to this party were furnished with broad-brimmed gray felt hats, which added materially to their comfort in the performance of their duty, protecting them from the sun much better than the uniform cap. They were also supplied with a thick-soled, hob-nailed, waterproof shoe, which was much better suited than the Government shoe for the rough work of building signals, and kept their feet dry when the men were obliged to stand for short periods in the water. There were a number of cases of simple diarrhea among the men, not necessitating excuse from duty. These cases were probably due to errors in diet; they did not occur in numbers at any one time nor near enough together to establish any relation to each other, or warrant the assumption that they arose from any local insanitary condition. This party furnished three cases to the sick list; one of vertigo, due to prolonged exposure to hot sun in an open boat, on the list one day; a second, an injury to hand, received while on liberty; the third, a case of cachexia malarialis, on the list five days. On the whole, the most of the party returned to the ship in better physical condition than when they left it; this has been noticeably so with one man who had previously had several attacks of intermittent fever, but has been entirely free from sickness since he joined the survey party.

The health of the ship's company during the year has been very good. There have been no epidemic diseases. The classes giving the largest number of cases are malarial diseases—not surprising after the exposure to the mangrove swamps at Jiquilisco Bay—and venereal cases, of which, however, there have been less than one might expect. The majority of the crew sleep on the forward and after berth deck and in the two wing passageways running fore and aft, between the bunkers and the engine and fire room bulkheads. These passages are connected by two alcoves. There are numerous steam pipes along the ceiling of the after berth deck and the passageways. In the after port side of the after berth deck is a nest of upright pipes that radiate an intense heat. These have recently been incased with boards, which modifies the heat radiated into the compartment. In this compartment opens the hatch, which is the only outlet for the heated air of the dynamo room, the temperature of which during a part of the month of August will be seen from the following table:

August—	4 a. m.	8 a. m.	12 m.	4 p. m.	8 p. m.	12 midnight.
	° F.	° F.	° F.	° F.	° F.	° F.
20	103	101	101	108	103	102
21	108	102	104	104	107	102
22	102	104	101	106	103	101
23	102	100	101	104	104	101
24	102	101	101	107	110	105
25	108	102	102	103	103	103
26	105	103	103	110	106	105
27	108	104	107	....	104	102
28	102	101	102	107	104	104
29	104	104	104	107	106	105
30	105	103	100	104	102	103

All these spaces are intensely hot in a warm climate, especially when underway. In port the deadlights on each side can be opened and give a good cross ventilation; but underway these must be closed and the three hatches from the upper deck, down two of which windsails are suspended, depended on for all cooling and ventilation of these compartments. The passageways have deadlights set in the spar deck, which can be opened in smooth weather and give some relief.

The following temperature records, which include the last three days at sea and the first week in port, taken on the passage from San Diego, Cal., to Honolulu, Hawaiian Islands, in the month of August, 1897, will give an idea of the temperature conditions:

August—	No. 1 thermometer.						No. 2 thermometer.					
	4 a. m.	8 a. m.	12 m.	4 p. m.	8 p. m.	12 mid-night.	4 a. m.	8 a. m.	12 m.	4 p. m.	8 p. m.	12 mid-night.
	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.
20	......	......	......	96	95	97	......	......	......	100	95	97
21	94	93	93	94	95	91	90	94	99	100	97	98
22	90	92	97	94	96	......	97	98	97	98	98	......
23	......	95	95	94	92	......	......	92	95	93	94	......
24	......	86	87	90	90	92	......	92	91	90	94	95
25	90	90	90	92	93	92	92	89	90	93	92	95
26	90	93	93	92	92	89	92	94	94	92	93	92
27	89	90	90	92	93	92	96	89	90	93	92	95
28	93	93	93	95	94	90	97	94	93	89	95	94
29	92	94	95	94	92	......	95	93	94	92	91	......
30	......	90	93	88	89	88	......	87	86	86	92	83

August—	No. 3 thermometer.						No. 4 thermometer.					
	4 a. m.	8 a. m.	12 m.	4 p. m.	8 p. m.	12 mid-night.	4 a. m.	8 a. m.	12 m.	4 p. m.	8 p. m.	12 mid-night.
	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.
20	......	......	......	90	89	87	......	......	......	80	80	......
21	94	87	89	90	89	......	......	79	80	81	84	84
22	......	89	87	89	89	......	83	80	80	81	83	......
23	......	85	87	87	87	......	......	80	81	82	82	......
24	......	87	87	86	86	86	......	81	82	81	81	81
25	85	87	86	86	86	86	80	80	81	81	81	81
26	85	86	87	87	86	87	80	80	81	82	80	82
27	86	87	87	86	86	86	81	80	81	81	81	81
28	87	87	86	87	87	85	81	80	81	82	81	80
29	82	85	87	87	85	......	82	82	83	82	80	......
30	......	84	83	85	85	84	......	80	81	81	80	80

The thermometers which furnished these readings were situated as follows: No. 1 on the outer bulkhead of the port wing passage; No. 2 over the master-at-arms' desk, on the forward bulkhead of the dispensary; No. 3 on the starboard side of the forward bulkhead of the after berth deck; No. 4 on the paint locker bulkhead in the forward berth deck.

From a study of these tables, it will be seen that there was practically no difference between the day and night temperatures. There was a decided difference, as was to be expected, between the readings of Nos. 1 and 2 and those of No. 4, which hung in the forward berth-deck compartment, that is free from steam pipes and has a hatch opening directly through to the forecastle deck.

The average temperature of the outside air is shown by the following table:

	August—										
	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.
Average temperature	76	78	77	78	79	79	80	80	81	81	79

A comparison of these tables shows that at sea there was a difference of over 20° between the outside air and the hottest living spaces of the ship and 10° between it and the coolest spaces; while in port, with the deadlights opened, the differences were reduced to 10° in the one case and to equilibrium of temperature in the other.

These high temperatures had a debilitating effect on all the crew, but the engineer's force suffered most. The deck force and marines were taken out into the cooler fresher outside air for their duty, while, on the contrary, the engineer's force on watch must descend to the hot and vitiated air of the fire and engine rooms. The following table gives the temperatures in the engine rooms during the last three days at sea; but on some of the previous days of the run higher temperatures were reached, the highest recorded being 117° in the engine room and 154° in the fire room.

Date.	In the engine room.						In the fire room.					
	4 a. m.	8 a. m.	12 m.	4 p. m.	8 p. m.	12 mid.	4 a. m.	8 a. m.	12 m.	4 p. m.	8 p. m.	12 mid.
	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.
August 20	110	106	108	112	112	109	142	145	140	134	140	136
August 21	112	115	114	111	113	114	134	140	140	134	140	134
August 22	111	110	110	114	108	114	135	140	140	140	140	140

The men of the engineer's force, all of whom swing in the wing passages and after berth deck, after four hours of severe and arduous toil in the frightful temperature of from 140° to 150°, would come off watch and endeavor unsuccessfully to get rest and sleep in the only comparatively less trying temperature of from 90° to 100°. Unable to sleep, worn out with fatigue and annoyed with prickly heat, it would be jaded and discouraged men who would respond to the next call to go on watch below. Is it to be wondered at that the medical officer is called upon to furnish stimulants to help keep these men up to their duty? Is it to be expected that men in such a condition can do efficient work? And may not a fire-room force in such a plight seriously cripple the fighting efficiency of a ship, as my predecessor has pointed out in his report.

It is to the credit of the crew of this ship that they persevered in their work under such trying conditions, and that, although several received treatment and were excused from completing watch, and all received stimulants regularly, only two were obliged to be put on the sick list. But a few days' longer passage would have reduced the men to a condition totally unfit for duty. It has been my experience once before—on the U. S. S. *Indiana*—to reach port after a not very long run with the engineer's force on the verge of paralysis from exhaustion. If such be the effect of moderate passages under conditions of peace, what would be the effect of a ship keeping the sea for longer periods in war times—of the excitement and fatigue of a chase?

Would it not be probable that a ship would arrive on the battle ground with a considerable portion of the crew already inefficient and hors de combat from exhaustion?

It would therefore seem desirable, in the construction and alteration of the newer ships of our Navy, to devise some method of overcoming the excessive heat, from which most all of them suffer. Or, if that should not be possible, then to increase the force of the men who must work in the parts of the ship subject to the high temperatures, so that they can have shorter hours on duty and longer off.

On this ship some relief for the engineers' force was obtained by allowing, on my recommendation, the men to swing at night under an awning on the spar deck. A great relief could be given by extending the rows of deadlights that now exist on the spar deck over the wing passages over both the forward and after berth decks. This is the more important as at present the ship is a very wet ship at sea and the present deadlights have to be frequently closed to keep the water out, whereas the proposed series would be protected by the forecastle deck and could be open in all weathers, both at sea and in port. The steam pipes which run through these compartments should be covered with some material which is a nonconductor of heat and encased. The extra trouble in repairing a leak in the pipes will be more than compensated by the increased health and comfort of the occupants of these compartments. It is earnestly recommended that these two remedies be applied the next time this ship is at a navy-yard.

There is very little to complain of in the after part of the ship, occupied by the officers, beyond the usual annoyances of steam pipes overhead and underfoot. There is a large air shaft to the poop deck from the wardroom country and protected hatches just forward of the wardroom bulkhead, which are always open. These give a good circulation of air between them, and each room is furnished with an electric fan.

It has been the custom on this ship to give, when under way, each watch in the fire and engine rooms some liquor, either during or at the end of the watch. On our way here from San Diego I conformed to the custom after the first few days, principally for its mental effect on the men, as they expected it and furnishing the liquor served to keep them contented. I have not had enough practical experience yet to feel like making a positive statement, but so far as my experience goes it has inclined me to be opposed to the issue of spirits to men subjected to high temperatures. It produces a temporary stimulation, but leaves the men ultimately in a state of lessened resistance. I believe a better stimulant, and a useful prophylactic, is the administration of strychnia. In those cases of heat prostration that give rise to muscular cramps I believe, theoretically, that subcutaneous injections of normal salt solution ought to give relief.

It would add very much to the comfort and health of the ship's company, especially in the tropics, if the ship were equipped with an ice machine. The want of ice was severely felt at Jiquilisco Bay, where it was impossible to obtain ice on shore. I recommend that an ice machine be installed at the first available opportunity.

The natural ventilation of the ship is poor and the artificial ventilation is practically nil. The blower which is supposed to furnish air to the forward part of the ship is worthless and does not run at all; that for the after part of the ship is so inefficient that it is practically useless. Occasionally it is run at night, but the current of air is so feeble that it may be disregarded in considering the ventilation of the ship. This condition of the blower existed when the ship was last at Mare Island and an unsuccessful effort was made to have it remedied. These repairs are imperatively needed and should be made at once. No doubt a good system of artificial ventilation would relieve to some extent the high temperatures referred to above. The system on this ship is the exhaust system. I have never seen the single system work with entire satisfaction, whether it was used as exhaust or as forced draft. I believe any system to be efficient should be double, using both the exhaust and forced draft.

Distilled water has been used, except when the ship was under repairs at Mare Island. The distilled water furnished is of very good quality. While using shore water at Mare Island I recommended that all used for drinking purposes be boiled, which recommendation was carried out.

The ship is lighted by electric lights, which are, when properly used, a great improvement over any other system of artificial lighting.

In storerooms, passageways, etc., it makes very little difference where the lights are placed, but in living quarters, wherever people must spend any considerable amount of time or do any form of near work with their eyes, the position of the electric lights becomes of vital importance. One of the most important points in the use of electric lights for such purposes is that no other than ground glass bulbs should be used, and if the ground glass diminishes the intensity of the light, this should be remedied by increasing the number of lights in the apartment. People can not be exposed to the naked arc of the ordinary electric light without sooner or later suffering with affections of the eye. Those with naturally weak eyes will, of course, feel it first, but all will suffer some. We have not had the electric light long enough to fully realize this, but every year more testimony accumulates against naked lights and bad installation.

Medical literature is beginning to furnish cases of eye affections and even blindness resulting from the improper use of electric lights. I have, myself, seen several cases in the service which I considered were directly due to improper use of the electric light, and were relieved by using the light properly placed. Dynamo men have been found to suffer from irritation and exhaustion of the retina, and have been found, on appearing for reexamination to have suffered a serious falling off in acuteness of vision. This subject is the more important in that it is so easily remediable. Ground-glass bulbs and proper position of the lights will do away with all the bad effects. As yet laymen do not appreciate the importance nor understand the principles of this subject. In officers' rooms, which are furnished with portable lights, it is rare to see the lights placed properly. This subject of the location of the lights in the living spaces of a ship, being of so much hygienic importance, should be determined by a board of medical officers.

The officers' closets, two in number, are furnished with a very insanitary bowl. The sides of the bowl are funnel shaped, and the force of water for washing out the bowl is not great. Although the closets generally are well kept, the construction of the bowls is such that the sides are almost never free from more or less fecal matter, except when first cleaned in the morning. These bowls should be replaced by a better type.

The men's closets are situated well forward on each side of the forward main deck. They are well kept and generally free from odor. There are four seats over an iron trough, and at the after end of the trough an iron plate about 2 feet broad continues upward the back side of the trough for 2 or 3 feet. This plate serves as a urinal. The trough is flushed out by a constant flow of a good head of water, and a sprinkling tube plays water constantly over the urinal plate. The trough is narrow and painted inside and out. It presents a very rough, corrugated surface on the inside, which must collect and retain more or less fecal matter. The inside of such a trough should have a smooth surface, and ought to be finished off with some porcelain enameling process. A cement, or better, a plate of glass, should be secured on the urinal plate to give it a smooth, easily cleaned surface. I recommend these alterations in the closets and heads.

The bilges are kept clear and are entirely free from offensive odor.

All the storerooms and the numerous nooks and corners below decks are well looked after, being kept neat and clean and well painted.

The sick bay at present used is the steerage, and makes a light, well-aired, and commodious sick bay. There are four bunks, and there is room for two hammocks, if necessary, besides a transom for the use of the apothecary. The dispensary set down in the plans of the ship is too small to be efficient, and there is no separate space for the sick to swing. They are swung in the hottest and most noisy part of the after berth deck. As it is not probable that junior officers will be again attached to this ship, it is recommended that the present sick bay be definitely assigned for that purpose and a few changes in the lockers and storerooms be made, so as to render it more convenient for use as a sick bay. If that were done this could be made an excellent and efficient sick bay for a ship of this size.

The battle station for the medical department has been designated in the forehold, and it is probably as good a selection as could be made; it gives plenty of room, is below the protective deck, and there is a hatch on each deck directly communicating with it, so that the wounded could be easily sent below. Ordinarily it is full of cargo and is not available as a drill station; at drill for general quarters, the wardroom mess room is used.

Just forward of the wardroom is a bathroom designed for the use of the wardroom officers. It contains a bath tub and four set bowls. It is never used by the officers; the only use to which it is put is as a sort of stow hole, and I would recommend that the tub and bowls be removed, the deck tiled, and from four to five shower baths put in. If this change could be made it would add very much to the pleasure and comfort of the officers, especially in hot weather.

The Queen's Hospital, Honolulu, receives some aid from the Government, in consideration for which it treats the natives free. The hospital has attractive grounds filled with native shrubs and trees. The main building is a two-story stone structure with small wards. There is a large airy detached ward, with about twenty beds, in which whites alone are received. Men from the ship have been sent to the hospital, where they have been well cared for at the expense of $1.50 per day. There are private rooms in the hospital, where officers could be sent; $3 a day is charged for the private rooms.

Since being in Honolulu I have had an opportunity to visit the leper settlement on the island of Molokai and the detention station near Honolulu. I have not seen enough of the disease to give any intelligent description of it, but it may be of interest to refer to the system for the control of the lepers.

In every district in the islands is a Government physician; this physician and the sheriff of the district are ex-officio agents of the board of health. If either one learns of a suspicious case the suspect is arrested by the sheriff and examined by the physician. If the result of this examination warrants it the suspect is sent to the detention station near Honolulu. This station is in an isolated position and has three separate inclosures: One is a home for the nonleprous daughters of lepers, and is cared for by Sisters of Charity; the second is for the reception of suspects, and the third for declared lepers awaiting transportation to Molokai. The suspect, on arrival at the detention station, is studied by the different members of the board of health; then, after a sufficient length of time, at an official meeting of five medical members of the board, who have all studied the case, a written vote is taken on each case. If there are four affirmative votes the suspect is declared a leper. If there are only three affirmative votes the suspect is allowed to go, but must report at each subsequent quarterly meeting of the board until his case is definitely decided.

The settlement at Molokai is ideally situated for quarantine purposes. A precipitious cliff, between 2,000 and 3,000 feet high, rising abruptly from the water for 25 miles, forms the northern coast of the island.

A little to the eastward of the center of the cliff there projects to the northward from the base of the cliff a triangular peninsula having an extinct crater, to which it evidently owes its existence. This peninsula is about 3 miles wide where it abuts against the cliff, and it is about 3 miles from the face of the cliff to the northern point of the peninsula. This peninsula is the site of the leper settlement. The only means of egress from the settlement, except by water, is by two very steep and dangerous foot trails up the face of the cliff. The lepers live in two villages, one on each side of the peninsula. The inhabitants live in small cottages, each with a bit of land about it. Some of them cultivate their gardens and make very attractive little places. Each village has a Protestant and Catholic church and a "Strangers' House" for the accommodation of visitors, into the inclosure of which lepers are not allowed to enter. In the western village is the Bishop Home for girls and helpless women, under the care of six Franciscan nuns, and at the eastern village is the Baldwin Home for boys and men, under the charge of four brothers of the Bleeding Heart.

When the leper arrives at the settlement he is assigned a house, and thereafter fed and clothed by the Government. They all appeared to be well cared for. The rations are issued once a week, in bulk and uncooked, and can be utilized according to the taste of the individual. An individual who has means may build his own house and live as luxuriously as he can afford, but at his death the house becomes the property of the settlement. The inhabitants are as little governed as possible, being given perfect freedom within the settlement. Many of them marry, and marriage is encouraged by the board of health, as tending to make the people more contented and raise the moral tone of the community. As a rule the leper is sterile. About 40 children represent the entire birth rate of the settlement for the last fifteen or sixteen years. Only about 10 per cent of the children born at the settlement become lepers. If the children remain clean after reaching 2 years of age, they are removed from the settlement, the girls mostly to the home referred to at the detention station near Honolulu; others are taken by relatives who are able to support the child. Of the children so removed only four or five have subsequently developed leprosy, and in some of these cases there was some doubt as to their being clean when removed.

At the time of my visit there were about 1,400 inhabitants in the two villages, of whom 200 were clean. Of the 1,200 lepers all but 20 were native Hawaiians; the other 20 included whites, Chinese, and Japanese. The 200 clean inhabitants comprise the brothers and nuns at the two homes, the priest and Protestant minister, the resident physician, a few Japanese (who are servants of the preceding), the nonleprous children of lepers, and helpers of lepers. These helpers or nurses are well relatives of lepers. Each helpless leper who is not in one of the homes is allowed one relative to care for him. To reduce the number of this class the helpless lepers are urged by the board of health to enter one of the homes. The helper is required to leave the settlement within a fortnight of the death of his charge.

The mother superior, who has been in the settlement thirteen years, and the resident physician told me that they use no antiseptic precautions for protection from inoculation. They depend on perfect cleanliness, always washing the hands after handling a leper, and living, so far as meals and sleeping are concerned, in houses that lepers never enter.

The Bishop Home for women is in a separate inclosure, and composed of a number of detached houses, each containing about 10 inmates. Everything was very neat and clean. The inmates are well cared for, and taught English, as well as domestic work.

The Baldwin Home for men is the most attractive part of the settlement. A great deal of attention is paid to lawns, gardens, and a farm. The houses for the inmates are built about three sides of a square; each house contains about 16 lepers. The inmates are graded as to age and advancement of disease. In the house to the left are the youngest boys and the least diseased. They progress until at the extreme right are the oldest men and those in the last stages of the disease. The boys are given an education and instructed in the simple trades—farming, shoemaking, and carpentry.

My impressions of the disease itself are that it is almost as multiform as syphilis, and that it must be very difficult for any physician who has not expert and special experience to diagnose a case in the early stage.

A great deal of reliance in the diagnosis is placed by the Hawaiian experts on the finding of the bacillus of leprosy.

As to treatment, I inferred from what the resident physician at the settlement told me that his treatment was entirely symptomatic. At the detention settlement experiments have been made with a bath of an artificial mineral water. The water has been made to correspond with that of the Kusatsu Hot Springs, in Japan, which enjoy a reputation in Japan as a cure for leprosy. Five baths a day are taken at a temperature between 115° and 120°. When all is ready, the solution is added to the bath and the patient douches his head with a dipper, while a nurse counts slowly 100; then he gets in the tub and immerses the whole body for three minutes. The following is the formula for 100 liters:

Sulphate of iron	grams	22.80
Calcium sulphate	do	25.50
Aluminum sulphate	do	118.00
Magnesium sulphate	do	29.99
Sodium sulphate	do	21.00
Potassium sulphate	do	21.00
Ac. nitro-muriatic	cubic centimeters	85.32
Ac. sulphuric	do	33.92

The bath is acid and causes some irritation about the inside of the thighs and testicles.

I believe that the opinion so far formed of the result of this treatment is that it ameliorates the disease, but does not cure.

I have been told by a member of the board of health that they believe they begin to see the good effects of segregation, as there is a decided falling off in the number of suspects brought before the board during the last two years, in spite of increased vigilance in seeking out suspects and a greater willingness on the part of diseased natives to be taken under the care of the board.

REPORT ON THE U. S. S. VICKSBURG.

By **Moulton K. Johnson**, *Assistant Surgeon, United States Navy.*

This ship was commissioned at the Portsmouth Navy-Yard on the 23d of October, 1897.

The complement of the ship was originally 124 men, including 12 marines, and a variable number of officers, from 9 to 11. Having, however, been assigned to the training service, the number of the crew will be variable.

The berthing space for the original crew would have been ample, but that number can not be greatly exceeded if crowding is to be avoided.

The arrangements of the dispensary and sick bay are excellent and on a scale proportional to the size of the ship. They are situated, contrary to the usual custom, on the port side of the gun deck, about amidships, and although adjoining, do not communicate. The dispensary, situated aft of the sick bay, is fitted with a bunk for the apothecary, a stationary washstand supplied with fresh water, and, with the additional shelves that have been put in since the ship was commissioned, has ample and convenient space for the stowage of the medical supplies. The sick bay is large enough to accommodate two swinging hammocks or cots, and it has also been fitted with additional shelves and lockers. Communicating with it aft is a smaller room fitted with a bath tub and a water-closet, the former supplied with hot and cold, fresh and salt water.

There are two large air ports in the dispensary—one in the bathroom and three in the sick bay. In addition to the ventilation thus secured, all are connected with the natural system of ventilation through the engine-room hatch.

The one drawback—and a serious one—is the fact that a manhole to one of the coal bunkers opens into the sick bay, and must be opened when coaling in order to stow the coal. It is needless to state the result of this operation.

The medical storeroom is of ample size and is situated under the wardroom. It has a slight tendency to dampness.

Ventilation.—The ship is ventilated by both the natural and artificial systems. The artificial ventilation is the "exhaust" system. Two Sturtevant centrifugal blowers are used, one forward of the fire room on the berth deck, and one on the after bulkhead of the engine room. These are designed to make between four and five hundred revolutions per minute, and each is independent of the other. The forward blower ventilates the forward berth deck, the dynamo room, and the forward magazines, and discharges into the fire room. The after blower ventilates the wardroom, the after magazines, the steering engine room, and the wardroom pantry. These blowers have only been run for a short period on the final trial trip of the ship, and then not at full speed; it is therefore impossible at this time to report intelligently upon their efficiency.

The natural system of ventilation is by means of cowls to the forward gun deck, the engine and fire rooms, by a system of pipes which discharge into the engine-room hatch. In the wardroom there are two air and light wells, one of large, the other of medium size. On account of the air ports of the wardroom being so near the water line, they can rarely be opened, even in port; this applies also to all air ports on the berth deck. In hot weather this will undoubtedly cause not only great discomfort, but insufficient ventilation, especially will this be true of the wardroom, situated, as it is, between the engine room forward and the steam steering engine room aft.

The officers' rooms are as large and comfortable as could be expected on a ship of this size; but the floor space is very small.

The captain's cabin is large in proportion to the size of the ship, is well lighted, and has good natural ventilation.

The officers' water-closets are situated on the starboard side of the gun deck about amidship and are thoroughly modern. They are ventilated by the natural system through the engine-room hatch and by an air port.

The water-closets for the crew are on the starboard side of the gun deck forward, and their most noteworthy feature is their crudeness, consisting simply of a trough covered by a few wooden seats. The system for flushing these, designed to be used when under sail, was a failure. A tank under the pilot house into which the flushing water was pumped was used as a reservoir, but the pipe to the "head" was led in such a way as to put the outlet on a higher plane than the tank. This is now being remedied. When under steam the "head" may be flushed by a pipe connected with the fire main.

Dynamos have not as yet been placed in this ship; the lighting is done by oil lamps and candles.

Fireproof wood is used in the construction of the decks and in nearly all of the fittings of the ship where wood is used at all. No bad effects up to the present time have been noted as due to its use.

The health of the officers and crew has been good, there being but ten admissions to the sick list during the fraction of the quarter that the ship has been in commission; but on account of the very disagreeable weather and the sudden changes in the temperature prevalent here during this season of the year many of the crew have been treated for various bronchial and catarrhal affections.

REPORT ON THE U. S. S. ANNAPOLIS.

By S. B. PALMER, *Assistant Surgeon, United States Navy.*

The *Annapolis* was placed in commission at New York July 20, 1897. She is a composite gunboat, having double bottoms beneath the engine and fire rooms only. Length over all, 203 feet 6 inches; beam, 36 feet; displacement, normal, 1,017 tons; draft, normal, 12 feet.

LIVING SPACES.

The captain's cabin is located aft on the gun deck. Forward of the cabin on this deck are the rooms of the executive officer and of the navigator. The wardroom and the rooms of the remainder of the officers are on the after-berth deck. In all there are rooms for 10 wardroom officers, with an average air space per room of about 335 cubic feet.

Forward of the wardroom, separated by a water-tight bulkhead, is the engine room. On the berth deck below the cabin and abaft the wardroom is the steam steering room. Between this and the wardroom there is a short passageway, on the sides of which are the storerooms of the cabin and wardroom. Except when absolutely required, the steam steering gear is not used, on account of the heat it produces in these four compartments.

One hundred and twenty of the men sleep in three compartments on the gun deck, the air space per man being about 110 cubic feet. On the berth deck 33 men sleep; air space per man, about 180 cubic feet.

VENTILATION.

For the purpose of artificial ventilation there are two Buffalo Forge Company's steam blowers, one on the gun deck aft, the other on the forward berth deck. The latter is not used on account of the heat generated in the compartment when it is running. The blowers work on the exhaust system. With the aid of wind sails, fairly good ventilation is maintained.

WATER SUPPLY.

The distilling apparatus has an estimated capacity of 3,000 gallons potable water per day. Practically about 1,200 gallons potable water is distilled per day, although in the Tropics the water, when supplied in this quantity, is warm.

WASH ROOMS AND WATER CLOSETS.

A suitable wash room is used by the men of the engineer's force.

The general wash room for the crew, which is forward on the gun deck, is at present used as a storeroom, the men washing on deck. As most of the cruising up to this time has been in pleasant weather, this has caused no ill effects.

The water-closets are satisfactory.

The head is well flushed and ventilated, and has spaces for 7 men.

LIGHTING.

Although the ship has a dynamo room, she has not been fitted with electric-lighting apparatus.

TEMPERATURES.

Steam pipes are used for heating. This vessel is fairly comfortable in both cold and hot weather, having been tested on the New England coast in November, as well as in the Tropics.

No excessively high temperatures have been noted in the engine and fire rooms. The two cases of heat exhaustion, of mild grade, which have been treated were men unaccustomed to this work.

PRISON.

There is one large cell, with an air space of about 200 cubic feet, on the berth deck forward.

ACCOMMODATIONS FOR THE SICK.

The sick bay and dispensary are conveniently located on the port side of the gun deck amidships.

The dispensary is well fitted. The fireproof wood used in the ship is objectionable here, however, on account of the injurious effects it produces on instruments and on the boxes in which some drugs are kept. For this reason the drawers and lockers are a source of great inconvenience.

The sick bay is excellent for a ship of this size. It has a capacity of about 585 cubic feet, and affords swinging space for a cot and two hammocks. A water-closet and bath tub are attached.

RECORD OF HEALTH.

The general health of the officers and crew has been excellent.

There were forty-one and a half days at sea and one hundred and twenty-three and a half days in port. The larger portion of this time was spent at New York, where the ship was undergoing repairs; along the Florida coast, and in the West Indies as a training ship for apprentices.

REPORT ON THE U. S. S. NASHVILLE.

By **Frank L. Pleadwell**, *Assistant Surgeon, United States Navy.*

The *Nashville* was placed in commission August 19, 1897, at the navy-yard, Norfolk, Va., and received officers and crew numbering 176. With the exception of about a month spent in the vicinity of Jacksonville, Fla., the ship has remained at anchor in or about Hampton Roads or moored at the navy-yard, Norfolk, Va. The period of time embraced by this report is therefore about four months, and since the ship has been exposed to no stress of conditions sufficiently extreme to thoroughly test her behavior at sea, the efficiency of the ventilating system, heat supply, etc., the observations and considerations herein submitted may necessarily be subject to modification after increased and wider experience under extremes of temperature, climate, and weather.

The conclusions arrived at have resulted from observations extending over a period of a little over four months and under the most favorable conditions of climate and weather. At sea the ship has proved to be remarkably steady, rolling but little, and the ventilation, with the exception of one or two compartments, has been satisfactorily accomplished when the blowers were run at their full capacity.

The health of the crew has been excellent, and there have been but few cases that could be attributed to faulty hygiene.

The *Nashville* is a twin-screw gunboat having three decks, with the upper deck flush fore and aft. The main deck in wet weather affords protection to the crew, with room for drill and exercise, and at night is the berthing place for the greater number of the crew. The closets, offices, galley, pantries, wardroom, wardroom staterooms, and cabins are all on this deck. The system of ventilation is natural—by means of ports and hatches. On the berth deck, forward, are the sick bay, dispensary, marine quarters, and additional berthing space for the crew. Amidships are the upper bunkers, on each side, outward and abreast of the machinery spaces, while between these are the boiler hatches, uptakes, wash rooms, machine shop, dynamo room, and engine hatches. Around and between these spaces is a passageway leading fore and aft. Abaft the engine hatches is the space fitted for the petty officers' quarters, and in the next compartment are two wardroom staterooms, wardroom baths, and storerooms. Below the berth deck are the magazines and storerooms forward and aft of the machinery spaces.

SICK QUARTERS.

The sick bay is situated in the extreme forward end of the ship, on the berth deck, between the first and second water-tight bulkheads. The first or bow compartment was originally designed with a torpedo tube, and the forward end of the sick bay was to be used for the storage of torpedoes in wire cages. Through a change in plans this bow compartment was changed into a paint locker, and the floor space designed to be taken up by torpedoes became a part of the sick bay. The objectionable features arising from the location of this paint locker, from its odors and the traffic consequent upon its location, led to an early condemnation and, through the recommendation of the commanding officer, to its removal and the substitution of oil tanks. This is a less objectionable use, but is still open to adverse criticism.

The sick bay has a capacity of 2,200 cubic feet, is well heated by three steam coils and ventilated by natural ventilation through seven 12-inch ports and one ventilating shaft, admitting air from the upper deck and a hatch 3 feet square opening on to the main deck. The artificial ventilation is brought about by 5 louvers, 3 on the starboard side being for exhaust or supply, those on the port side being exhaust only. The floor of the sick bay affords sufficient space for 4 swinging cots, though with some crowding, and narrowing forward makes the disposition of the new swinging cot in a manner to allow of its free swing very difficult. On the starboard side is a door into the bathroom, containing a porcelain bath tub with taps for fresh and salt water and steam, and a water-closet of the Bishop type. On the port side aft is the entrance to the sick bay, opening from the marine quarters. The nearness of these living quarters precluded the possibility of that privacy and quiet so necessary for a sick bay until a tight wooden door was fitted, mitigating this trouble to a great degree.

The dispensary is located aft, in the next compartment, and is not of easy access from the sick bay; but this is irremediable. The dispensary is fitted with new bottle racks and bottles, lockers and closets, and is supplied with a set bowl and running water. The sliding ointment slab, pill tile, and powder board are a great convenience and improvement. A folding bunk is provided for the apothecary.

The dispensary has a capacity of 228 cubic feet, and is ventilated by one port and one louver.

Great inconvenience to the sick and those in charge arises from the location in the central floor space of the sick bay of the hatch for the fore hold, which leads to traffic and disturbance from the breaking out of tackle, gear, and provisions. The sick bay has recently been provided with 4 metal swinging cots and a new metal operating table and a locker for minor medical supplies.

MEDICAL SUPPLIES.

The medicines furnished the ship have been satisfactory, and in anticipation of a foreign cruise such supplies as were deemed insufficient in amount were supplied by special requisition. The instruments supplied to the ship are amply sufficient. By special requisition bottles for irrigating solutions have been supplied, and are placed, secured in racks, over a locker in the sick bay.

LIVING SPACES.

Berthing spaces for crew.—The crew are comfortably berthed, and the cubical air space per capita is as good as is usually found on shipboard; but in cold weather, in those berthing spaces dependent upon natural ventilation for renewal of air, the air soon becomes vitiated on account of the closure of inlets necessary to avoid the creation of drafts. Most of the crew are berthed on the main or gun deck. The marines are berthed and live in the compartment abaft of the sick bay, on the berth deck, which is well lighted with ports and ventilated by louvers from the artificial ventilating system. Abaft of the marine quarters, on the berth deck, is another living space, which serves for the berthing place for the petty officers of the engineer force. It is ventilated by 6 louvers from the blower system. The air space of this compartment is encroached upon by two blowers and cumbrous desks. Abaft of the engine hatches, on the berth deck, are the quarters devoted to the uses of the petty officers. There are 11 bunks, and others swing in hammocks. This compartment is traversed by a number of steam pipes, and for this reason the proper regulation of its temperature is rendered exceedingly difficult. To combat this condition, there is a large ventilating shaft leading to a hatch on the spar deck, furnishing light and air; but in cold weather to have this hatch open sufficiently to ventilate the compartment means that many men berthed just below it must be exposed to a direct and violent draft. To remedy this there should be marked efficiency in the artificial ventilating system, and unfortunately this does not exist. The small ventilating shafts, whose terminal louvers open into this compartment, form small branches of a system whose main working effect is to deliver the air from compartments aft to the engine room. There is a marked inefficiency in this system, and on testing for movement of the air at the mouth of open louvers but little is found.

The wardroom is situated on the after part of the main deck, extending athwartship. There are 5 staterooms on each side of the wardroom country. The wardroom is well lighted and ventilated by the wardroom hatch and 6 square air ports 15 by 18 inches, which can be kept open in ordinary weather, owing to a high freeboard. Heating is accomplished by a steam pipe inclosed in a grating running around the wardroom on the baseboard line. It is questionable whether this arrangement would prove entirely sufficient in very cold weather. When at sea some list is inevitable, and one side of this system would be thrown out of use from the collection of the water of condensation. To obviate this it has been suggested that additional drains be placed to drain these dead ends at the side of the wardroom.

THE CABIN.

The cabin is located on the main deck, occupying the after part of the ship. The cabin stateroom and bathroom open out of the cabin on the starboard side. The cabin is well lighted and ventilated, and has an air space of 1,380 cubic feet. Ventilation is natural, by means of air and gun ports and hatch.

The following table gives the air capacity of the different living spaces:

Living spaces.	Capacity.	Number of occupants.	Air space per occupant.
	Cubic feet.		*Cubic feet.*
Cabin	1,380	1	1,380
Wardroom:			
Staterooms	2,640	10	264
Country	2,120	10	212
Sick bay	2,224	(*a*)	....
Marine quarters	2,603	12	216
"A-103"	1,801	11	163
Petty officers' quarters	4,616	22	209
Main deck	17,552	119	149

a Variable.

VENTILATION.

Artificial ventilation is provided on the berth deck, and all below, by means of seven electrically driven fans of the Sturtevant type. All above the berth deck is ventilated by open hatches and air and gun ports and ventilating shafts. There are two blowers forward of bulkhead 33; the one on the starboard side is arranged for both supply and exhaust, and the one on the port side for exhaust only. There are two blowers on the starboard side abreast of the after boiler hatch, both supply, and they serve their own compartment and the one just forward. The next two are in the petty officers' quarters, one on each side, and exhaust only. They draw from the quarters aft and deliver into the engine room. The remaining one is situated in the steering-engine room and supplies its own and adjacent compartments with air.

All but one of these blowers are worked by 2-kilo-watt motors, the exception being a 3-kilo-watt motor.

The efficiency of the artificial system of blowers on the berth deck and below is as yet but partially estimated, since the ship has labored under the best conditions of temperature and weather, and observations and experience under extreme conditions may develop failings not yet apparent. When in port and means were at hand, an analysis of the air in the several living compartments on the berth deck showed that by natural means alone, viz, ports, hatches, etc., the air soon became vitiated, and showed a high percentage of CO_2; thus demonstrating the necessity for a continuous running of blowers. Of the seven blowers supplied to the ship but one is capable of being used on the plenum, or supply method; the remaining ones operating by exhaustion of air from compartments into which the louvers open. The exhaust system is open to criticism from one or two objectionable features, which should make the system by supply of air from the spar deck supersede the other, since in the former the supply of air taking the place of that withdrawn is apt to be from adjoining compartments below or on the same deck, the air of which is already to a great degree vitiated. Another serious objection in the purely exhaust system is the diminished efficiency bound to result from the accumulation of dust in the constricted and tortuous parts of the air ducts, the wire gauze covering the mouth of the louver failing to prevent its entrance into the conduits, and a steady accumulation there and its inaccessibility render a greatly diminished capacity of exhaustion extremely probable. The amount of dust, vegetable fiber, and débris which collects at the mouth of a louver in the course of a week attests the likelihood of such a conclusion. These objections to the exhaust system should condemn it in favor of the plenum and outweigh the objectionable features of the latter. It would seem that blowers which are capable of being reversed at will from one to the other method to suit varying conditions of temperature and climate are the best.

In the tropics and in warm weather the plenum method is desirable from its electric-fan effect. In cold weather this is not comfortable, from the brisk draft it creates. Inspection and observation of the ventilating system have revealed an insufficiency in two systems. The louvers on the starboard side of the sick bay, when examined for movement of air at their mouths by suspension of a strip of tissue paper, reveal little current of air, as evidenced by motion of the paper. Since louvers from the same blower on the other side of the bulkhead show a high current of air, it is presumed that there is something locally defective in this part of the system as yet undetermined.

Similarly, the starboard louvers in the petty officers' quarters show very little exhaustion of air. Here the difficulty seems to be with the general plan of the system—designed to act over too large an area. Except in cold weather, the ventilation of the gun deck is satisfactorily accomplished by means of hatches, ports, and open gun ports. In very cold weather it becomes impossible to maintain the purity of the air at the proper standard without creating disagreeable drafts. The ventilation of the wardroom is accomplished by large, swinging ports, 15 by 18 inches, six in number, and, except in rough weather, they can always be open, owing to the high freeboard. Electric fans aid in the maintenance of ventilation in warm weather. The wardroom staterooms are dependent upon air ports for ventilation, two of the rooms on the berth deck being provided in addition with a louver each from the artificial system and electric fans. Ventilation in the cabin is by gun ports, air ports, and hatches, and is satisfactory.

FACILITIES FOR BATHING.

No provision is made for the bathing of the seaman branch of the crew, except such as they may get in warm weather on the open deck from buckets and hose; but in cold weather they are obliged to await an opportunity to bathe from a bucket, forward on the gun deck. This part of the deck is, in consequence, kept in a state of dampness, which gives rise to a degree of atmospheric humidity inimical to the health and comfort of those whose berthing space this is. It is deplorable that no space is available for the installation of rain or douche baths for the crew. Provided for the use of the chief petty officers is a wash and bath room on the starboard side of the gun deck forward, with a water-closet and a shower bath, the floor being made of cement and stone mosaic. The firemen's wash room is situated on the berth deck, just forward of the machine shop; is provided with shower baths and a number of set bowls for washing, the floor being cement and stone mosaic. On the starboard side of the dynamo room, on the berth deck, is the wash and bath room for the machinists, with set bowls and a shower bath. These latter wash rooms, used as they are by a large number of men, require constant care and attention to insure even a comparative degree of cleanliness. As they were originally fitted with urinals, a perceptible odor made them very offensive at times, and it was suggested that they be done away with, as no extreme exposure of the men results from their going to the regular water-closet on the gun deck. Opening from the after passageway on the berth deck is the wardroom bathroom, furnished with a set bowl and a porcelain bath tub, with running water. In addition, each room is furnished with a tin bath tub.

The cabin is provided with a bathroom, forward of the cabin stateroom on the starboard side, furnished with a porcelain bath tub, water-closet, and set bowl.

THE BRIG.

The prison is situated on the starboard side of the gun deck forward, and is ventilated and lighted by one air port and by perforations in the upper part of a metal door. It has no provision for heating, and in cold weather becomes too uncomfortable for occupancy. It has a cubical air capacity of 140 cubic feet, and can accommodate but one prisoner.

WATER SUPPLY.

With the exception of a trace of salt, which comes from too rapid distillation, the water produced has proved ample in quantity for the ship's use and of good quality.

The distilling apparatus consists of a Baird No. 4, with one evaporator and two distillers, having a continued capacity of 4,000 gallons; but in practice the average daily output has been about 2,300 gallons. For the storage of water there are two tanks forward in the hold, but easily accessible to inspection and easily cleaned. The tanks have a combined capacity of 2,400 gallons.

With the forward and after trimming tanks, which can be used for the storage of fresh water, there is a total carrying capacity of 9,020 gallons.

ICE MACHINE.

Although a refrigerating plant was originally designed to be placed in the ship it was not installed on board. It is deplorable that this is the case, as much inconvenience and suffering result from the absence of cool water and the fresh provisions which cold storage allows. The facilities for the storage of provisions are inadequate, as the ice chests are very small, and it is impossible to carry more than two or three days' provisions.

WATER-CLOSETS.

Opening from the forward compartment on the gun deck, on the port side, is the seaman's "head," with six closets and two trough urinals. The closets are flushed by the raising of a lever at the side, and can not be arranged for continuous flushing, where cleanliness is not dependent upon the whim of the one using the closet. As it is, this variety is with difficulty kept clean and soon fouls and becomes disagreeable. The ventilation is satisfactorily accomplished by two ventilating shafts to the upper deck and by four air ports. The floor is of cement and stone mosaic, and all parts are readily accessible to cleaning.

One bowl urinal, situated on the inboard side, has been abolished, as its drippings were constantly fouling the floor from its position inboard and their flow outboard. The head is entered from the gun deck by a tightly closing door, and odors, if present, do not penetrate to the berthing spaces adjoining. A closet of the Bishop type is provided for the use of the sick, and is placed in the bathroom leading off the sick bay. The petty officers' water-closet, furnished with one seat, is placed on the starboard side of the gun deck, forward. The cabin and wardroom closets are satisfactory, easily accessible, and well ventilated.

ENGINE AND FIRE ROOMS.

The engine room derives its supply of air from two sources. The after blower, abreast of the boiler hatch, on the starboard side, delivers fresh air by two air ducts into the engine room forward. Aft, it receives by two ducts all that is collected by exhaust in compartments aft. The usual engine hatches provide for the exit of air, and wind sails aid in the maintenance of ventilation. The temperature of the engine room exceeds that of the fire rooms by several degrees. This is to be attributed to the number of steam pipes which pass fore and aft close overhead. The fire rooms are ventilated by the usual hatches, and in addition the forward fire room has two ventilating shafts running to the upper deck. The fire rooms have proved very comfortable, even in warm weather, under way, their average daily temperature being 102.7°, while that of the engine room has been 109°. The dynamo room and machine shop receive an ample supply of fresh air from the artificial ventilating system, and can be well ventilated. The temperature is never extreme.

LIGHTING AND HEATING.

The lighting is by electricity throughout the ship, but lamps are provided when the dynamos are not running.

Serious impairment of the ventilation results, especially in damp or cold weather when natural means of ventilation are inoperative, through closure of ports, hatches, etc., since the blowers are dependent upon the electrical current for their motive power.

The vitiation of the air under these conditions is extreme, and the discomfort resulting baneful to health. Upon recommendation they have been run continuously. The heating is by steam coils, and, in the main, is satisfactory and efficient.

STATION IN BATTLE.

The vulnerability and inaccessibility of the sick bay led to the selection of the wardroom as the station at general quarters.

Its vulnerability is no less than the sick bay, but it is more easily accessible from the upper deck, the wounded being lowered through the wardroom hatch. An objection is the necessity for the transportation of instruments, antiseptic solutions, etc., from the sick bay and medical storeroom.

SPECIAL REPORTS.

REPORT ON THE NINTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

By J. R. TRYON, *Medical Director, United States Navy.*

The congress which convened at Madrid, Spain, April 10–17, 1898, under the patronage of His Majesty King Alfonso XIII and Her Majesty the Queen Regent, was successfully inaugurated through the efforts of the organizing committee appointed by royal decree October 16, 1894. This committee was composed of his excellency the Minister of the Interior as president, the Under Secretary of the Ministry of the Interior as vice-president, and Dr. Amalio Gimeno, professor of the Faculty of Medicine of Madrid, senator, and member of the Royal Academy of Medicine, as secretary-general.

Under this organization an executive committee was appointed composed of president, vice-president, and secretaries, and an exhibition committee, finance committee, and reception committee, with requisite number of officials.

Invitations to the congress were extended to Governments, universities and schools, prominent scientific bodies, physicians, veterinary surgeons and apothecaries, demographers, engineers, architects, and men of science who had given particular attention to hygiene and demography. The scope of the congress can only be realized by an examination of the various subjects submitted for discussion in the different sections.

Hygiene comprised ten sections, as follows:

SECTION 1.—MICROBIOLOGY IN RELATION TO HYGIENE.

I. Necessity of unity in technics in the nature and composition of the means of culture, etc., for the determination of the peculiarities of each bacterian species, and advisability of a revision of the descriptions and classifications of the pathogenic bacteria already known by an international committee of bacteriologists.

II. The results of the latest studies on the spread of typhoid fever.

III. An inquiry into the choleraic bacillus in waters and its differentiation from other similar species.

IV. Of immunization and the means of obtaining it.

V. Bacteriology, prophylaxis and serum-therapy of the bubonic plague.

VI. Anti-streptococic serum-therapy.

VII. Protozoic diseases from the hygienic point of view.

VIII. In the present state of microbiology as applied to the etiology of carcinoma, what are the positive results that may be useful to hygiene?

IX. Bacteriology and serum-therapy of yellow fever.

SECTION 2.—PROPHYLAXIS OF TRANSMISSIBLE DISEASES.

I. Limits of the action of Governments in the enforcement of prophylactic precepts.

II. Compulsory vaccination.

III. Of leprosy, particularly in Spain. Measures for the prevention of its spread.

IV. Of pellagra. Etiology and prophylaxis. A geographic study.

V. What is the most advisable organization of the sanitary service in land frontiers in the case of exotic epidemics, especially in what refers to disinfection?

VI. Of cadaveric cremation as a prophylactic measure. Latest improvements.

VII. The cheapest, easiest, and most efficient methods and proceedings for the disinfection of dwelling houses.

SECTION 3.—MEDICAL CLIMATOLOGY AND TOPOGRAPHY.

I. Of climate and topography, as cooperating, and as antagonistic elements in the evolution of infectious diseases.

II. Climatic zones of Spain.

III. Winter climatology of the Spanish seacoast in the Mediterranean.

IV. The death rate in countries where rice is cultivated; is it higher or lower than in others?

V. Of longevity in relation to climate.

VI. Geography of tuberculosis. Map of the same in Europe. A study of climatology so far as this disease is concerned.

SECTION 4.—URBAN HYGIENE.

I. In the present state of hygiene, what is the death rate required to consider a town as unhealthy?

II. On irrigation fields as referred to hygiene.

III. True pathogenic influence of sewer air.

IV. Filters for potable waters in public fountains.

V. The watering of streets; is it detrimental to the health of towns?

VI. Sanitation of economic dwelling houses.

VII. Of the systems of urban growth, namely, the increase in number of buildings, or the enlargement of buildings, whether by increase in area of ground floor, or by elevation of the same. Which of them is to be preferred, as offering greater guaranties of physical and mental health?

VIII. Of the possible sanitation of cemeteries that on account of the expansion of towns are now placed in the interior of the same, by means of physical and chemical agents combined with the sanding of the ground and the action of atmospheric air.

IX. Public slaughterhouses; construction, regulations, and general service. Microscopic examination and employment of tuberculin as a means of early diagnosis of tuberculosis.

SECTION 5.—HYGIENE OF ALIMENTATION.

I. Etiological importance of milk in the transmission of tuberculosis and measures to prevent the use of such as may contain the tubercular bacillus.

II. On the most rapid means of bacteriological analysis of potable waters.

III. Alcoholism in Spain.

IV. Mixtures and operations that are practiced with wine for its betterment and preservation.

V. Recent means of analysis for the determination of impurities contained in alcohol.

VI. Sanitary measures to prevent the pathogenic effects of the alterations to which alimentary substances, preserved in different ways, may be subject.

VII. Necessity of a radical departure from the present standard in awarding prizes to live stock, in order to avoid rewarding fatness rather than the sound and genuine representation of the species.

SECTION 6.—HYGIENE OF INFANCY AND OF SCHOOLS.

I. Causes tending to the increase of mortality in infancy and the remedies. Comparative statistics.

II. Prophylaxis of purulent conjunctivitis in the new born.

III. Hygiene of sight and prevention of contagious eye diseases in schools.

IV. Influence of seaside resorts in the prophylaxis of infantile diseases.

V. School colonies and their practical results.

VI. Boarding school from the hygienic point of view; its advantages and its drawbacks.

SECTION 7.—INDUSTRIAL HYGIENE.

I. Which is the best classification of industrial establishments?

II. Women and children's work in mines, workshops, and factories.

III. On the housing of miners and general workers.

IV. Cinnabar mines, with the best means for the hygienic protection of miners.

V. Calcination of minerals in the open air.

VI. Hygiene in coal mines, with a statement of the most advisable sanitary regulations in collieries.

VII. Hygiene in travel by railway.

VIII. At what age should there be a transition from natural exercise to the specialized and disciplined movements of the gymnasium?

IX. Hygiene of cycling.

X. Latest improvements for the prevention of explosions of steam apparatus in industry, and the surest ways to preserve workmen from such accidents.

SECTION 8.—MILITARY AND NAVAL HYGIENE.

I. Hygiene of naval and military forces in unhealthy countries.

II. Dress that is to be preferred to that at present used by our Army in hot climates.

III. Necessity for the application of bacteriology for determining unfitness for military service on account of tuberculosis and of leprosy.

IV. On asepsis in dressing stations established in the fighting line, in stationary hospitals, in those of the second line, and in permanent ones.

V. International prophylactic measures that ought to be adopted for the sanitary inspection of ships.

VI. Sanitation of infected ships.

VII. Hygiene of modern war ships.

VIII. Hygiene of the engineers' force of ships.

SECTION 9.—VETERINARY HYGIENE—CIVIL AND MILITARY.

I. Means for the prevention of the spread of tuberculosis in domestic animals and the transmission of the same to the human species.

II. Necessity and advisability of sanitary regulations relating to domestic animals.

III. Conditions which ought to be required in animals from which serums and vaccines are obtained, and the intervention which is to be assigned to the veterinary surgeon.

IV. Hygienic and prophylactic measures for the prevention of glanders in live stock for army purposes.

V. Veterinary, hygienic, and sanitary rules in cavalry barracks.

VI. Preventive antitetanic serum for live stock, with the advantages derived from its employment.

SECTION 10.—SANITARY ARCHITECTURE AND ENGINEERING.

I. Indispensable hygienic reforms in urban construction in Madrid.

II. The building materials from a hygienic point of view.

III. Hygiene in the construction of asylums for infants; foundling hospitals.

IV. Hygiene in the building of penitentiary establishments.

V. Operating rooms in hospitals; how they are arranged.

VI. Which is the best use that may be made of the refuse in the streets?

VII. The present regulations for the interior drainage of dwelling houses; are they the best to prevent the infection of buildings?

VIII. Means to prevent the infection of air by the openings for heat and ventilation when hot air and central ventilation are used in the warming of dwelling houses.

IX. Accidents in the transferrence of electric energy, and how to prevent them.

Demography comprised three sections, as follows:

SECTION 1.—TECHNICS OF DEMOGRAPHIC STATISTICS.

I. Which is the simplest, cheapest, and most rapid method for the registration of inhabitants in a census?

Would it be possible to substitute the family schedule for the individual one, accompanied by another including the necessary data of family and household?

II. Graphic methods employed in statistics. Which is the best for the teaching of demography in relation to hygiene?

III. Necessity of a statistics of labor in Spain.

IV. Organization of statistics in Spain.

V. The most practical means to obtain a true statistics of disease, mortality, and longevity in trades and professions.

VI. Which are the best means to obtain with the strictest accuracy the age of persons included in the census report?*

VII. Necessity of a rational and scientific classification of diseases with regard to the statistics of disease and mortality in every country.

VIII. Necessity of a classification of professions. Means to be employed for the acceptance by every nation of the classification considered as the most perfect.

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*Dr. Zoltan Bagl's theme.—Budapest. Admitted for discussion in the Ninth International Congress.

SECTION 2.—STATISTICAL RESULTS IN RELATION TO DEMOGRAPHY.

I. Do statistics afford any proof of the prolongation of human life in the present century?

II. Statistics of consanguineous marriages. Influence of the same in the diseases, deformities, and anomalies of their offspring.

III. Statistics of prostitution as compared with those of marriages, the fecundity of the same, and the age at which married life should begin.

IV. On births in relation to marriage and natural fecundity.

V. Statistics of the average height of individuals called to military service in different countries.

VI. Statistics of mental diseases. A comparison of the same in different times and countries.

VII. Statistics of epileptics.

SECTION 3.—DYNAMICAL DEMOGRAPHY.

I. Movements of population in Europe during the last decade and consequences which may be applied to hygiene.

II. Law regulating the exaggerated growth of population in large towns and a statement of the most practical means to restrain it.

III. Spanish emigration; its causes; means to make it diminish or to render it useful to Spanish interests in the colonies.

IV. Disadvantages and dangers of rural absenteeism to the equilibrium of population and of public wealth.

V. Influence of hygienic measures on the growth and quality of population and the conclusions which may be applied to the theory of population.*

During the session of the congress there was an international exhibition of hygiene and demography, divided into ten classes, as follows:

1. Didactic hygiene.
2. Prophylaxis of transmissible diseases.
3. Urban hygiene.
4. Hygiene in relation to dwelling houses.
5. Hygiene in what refers to exercise and work.
6. Naval and military hygiene.
7. Hygiene of infancy and schools.
8. Food and dressing.
9. Demography and statistics.
10. Miscellaneous.

Preparatory to the formal opening of the congress a preliminary meeting was held the evening before at the Theater Royal, to which the delegates were invited.

On Sunday, April 10, the inaugural session of the congress took place at the Palacio de la Biblioteca Museos Nacionales, the order of the exercises embracing addresses by the president of the congress, presidents of the permanent international commission, presidents of foreign delegations, the mayor of Madrid, secretary-general, and others. During the week the usual festivities on such occasions in honor of the members of the congress were strictly observed, including excursions to Toledo and the Escorial receptions by the Queen and minister of state, visits to hospitals, national museums, and other places of interest. The final session took place on Sunday, April 17, at the Palacio de la Biblioteca.

During the session of the congress a daily journal was published, giving the order of the day for each section and other matters of interest to the delegates. It was impossible to give professional attention to more than one section, and consequently attendance was limited to the section of "Military and naval hygiene." The paper prepared for the congress on "The United States Naval Museum of Hygiene, Washington, D. C., its foundation, growth, etc.," with accompanying photographic album of views of the establishment and catalogue of exhibits, was referred to this section. The officers of the section consisted of two honorary presidents, one president, Señor D. Bernadino Gallego, two vice-presidents, and four secretaries.

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*Ferraris's theme.—Budapest. Admitted for discussion in the Ninth International Congress.

Aside from the stated questions presented for discussion, valuable and interesting papers were submitted during the several meetings. The most noticeable, "Sanitary statistics of the army of the Island of Cuba," by Dr. Larra Cerezo; "The pathological anatomy of yellow fever," by Dr. Hernandez; "The character of food best adapted for troops in the tropics," by Dr. Vives; "The first aid to wounded in time of war," by Dr. Navarro; "Health of troops ashore and afloat in tropical countries," by Dr. Caro, and papers by Drs. Montaldo and Stolle.

It was impossible to obtain a synopsis of these papers, as their publication will appear in due time in the official proceedings of the congress. One of the most interesting features of the session was the official inspection by members of the congress of the military hospital of Madrid at Carabanchel Bajo, a few miles from the city. No one without visiting this celebrated establishment can form any idea of its extent and thorough equipment. Modern in every particular, it embraces facilities for the accommodation of sick and wounded of the army unsurpassed in any country, so far as I have observed.

The institution is entirely under military control, with a large and efficient staff of medical officers.

During the entire session of the congress, from its inauguration till adjournment, April 17, every courtesy was extended to foreign delegates by Spanish officials and others in authority. Photographs and catalogue of exhibits of Naval Museum of Hygiene, Washington, D. C., were presented, by request, to the president of the section of naval and military hygiene for the Military Institute of Hygiene at Madrid.

It was announced prior to adjournment that the Tenth International Congress of Hygiene and Demography would be held in Paris, France, in 1899.

INSPECTION OF MUSEUMS OF HYGIENE AT PARIS AND LONDON.

There is no special museum of hygiene in Paris. An inspection of the Lefebvre establishment devoted to the construction of ambulance material, etc., for the army and navy in colonial service was interesting and instructive. Articles especially noted that would be of use in the navy in time of war with landing parties were surgical carriages with fittings, including operating table, dispensary, etc.; aluminum cases of different dimensions for safe and easy transportation of stores; model hospital tent with fittings to be transported on wheels if necessary, with cots, lanterns, etc., and single hospital tents with all accessories to accommodate from 30 to 35 men. A complete catalogue giving accurate information regarding the numerous useful outfits furnished will accompany this report, with other printed matter relating to the congress, and Museum of Hygiene, London.

THE SANITARY INSTITUTE, PARKES MUSEUM, LONDON.

I was furnished with the following information relating to its foundation in 1876 and incorporation in 1888:

The Parkes Museum was founded at a meeting presided over by Sir William Jenner, Bart., M. D., F. R. S., on July 18, 1876, in memory of the late Edmund Alexander Parkes, who was the first professor of hygiene in this country. He was appointed to the Army Medical School, established in 1860, by the late Lord Herbert of Lea.

Her Majesty the Queen and other members of the royal family were among the first subscribers to the funds of the new institution.

In 1877 the council of University College placed commodious galleries at the disposal of the committee of the museum. These galleries were soon filled with objects illustrating various branches of the science of hygiene, and on June 28, 1879, the museum was formally opened to the public by the Right Hon. Sir R. A. Cross, G. C. B., secretary of state for the home department.

In 1880 a public meeting was held in the Mansion House, under the presidency of the lord mayor, in support of the museum.

This meeting led to a considerable increase in the number of subscribers, and several of the city companies contributed to the funds of the museum. A second meeting was held in 1885.

In 1881, on the occasion of the meeting of the International Medical Congress in London, the committee of the museum organized the International Medical and Sanitary Exhibition, which was held at South Kensington, in the buildings of the commissioners of 1851. This exhibition was the first of its kind in London and was the precursor of the great Health Exhibition of 1884.

In 1882 the museum was incorporated, and his royal highness the late Duke of Albany became its first president. As, however, the council of University College now required, for other purposes, the galleries they had lent to the museum committee, it became necessary to make new arrangements for housing the collection, which had by this time considerably increased. The museum was accordingly removed to the new premises in Margaret street. About £1,500 were expended in adapting the premises to the requirements of the museum, the drainage and other arrangements of the building being especially designed and constructed so as to be available for teaching purposes.

In 1883, on the 26th of May, the president, his royal highness the Duke of Albany, opened the museum in its new premises and delivered an address, of which the following were the concluding words:

> Our endeavor will be to make the Parkes Museum in every way worthy of the man whose name it bears. To do this we look for the ungrudging and cordial support of all who are interested in sanitary progress. If such support be accorded us, we may fairly hope that the museum will help materially in the dissemination of that branch of knowledge which, in the words of Dr. Parkes, aims at rendering growth more perfect, decay less rapid, life more vigorous, and death more remote.

A large number of practical demonstrations and lectures have been given from time to time in the museum.

In 1886 courses of training lectures suitable for students preparing for the examinations of the Sanitary Institute were established and carried on with great success.

In August, 1888, the Parkes Museum was amalgamated with the Sanitary Institute of Great Britain and incorporated under the title of The Sanitary Institute, the memorandum of association providing for "the maintenance in London, or elsewhere in the United Kingdom, of a museum of hygiene to be called the Parkes Museum, to aid in the scientific investigation and practical study of all matters relating to health and the laws thereof and as permanent memorial of the late Edmund Alexander Parkes, M. D., F. R. C. P., F. R. S."

The whole purpose of the museum is to serve as a means of practical demonstration and teaching for sanitary science, and is not designed as an attractive exhibition. Many of the exhibits are introduced to illustrate defects in material or construction; others are selected to illustrate rather the class they represent than any special merits of any one particular make, but for the guidance of those seeking such information a pamphlet is published containing a list of appliances which have been approved by the judges at the exhibition held under the auspices of the Sanitary Institute.

The size and scope of the present building is far below what is felt desirable and even necessary for the complete demonstration of practical hygiene, but as the museum is not in any way subsidized by the State, and is supported entirely by the donations and subscriptions of private members, the council is much encouraged by the progress already made, and hopes that in the future it may grow into a still more useful and representative institution.

The museum embraces a library and lecture hall, a very compact and complete food collection, a great variety of sanitary apparatus in working order, with water supply, apparatus for heating, warming, and ventilating, appliances for the sick room, and miscellaneous articles conducive to health. The library contains many hundred volumes of works on sanitation. The entire establishment is open free to the public daily from 10 a. m. to 6 p. m.

The growth of the institute has been continuous, and all reports indicate the general progress which is taking place in the diffusion of sanitary knowledge. Sessional meetings for the discussion of subjects of interest to sanitarians are held at stated times during the year, affording an opportunity for an interchange of opinions among those who are interested in the subjects submitted. "The sanitary supervision of shelters for the homeless," "Indian sanitation," "The pollution of water supplies by encampments of hop pickers, casual workers, and tramps," etc., characterize the nature of the papers presented.

The attendance at the meetings vary from 60 to 150.

Regular courses of lectures and demonstrations on sanitary science are held each year, and to make the course as practical as possible, aside from the examination of plans and models belonging to museum exhibit, personal inspections are made of public sewage works, water works, electric light and refuse destroyer works, disinfecting and filtering works, etc., showing the difficulties that have to be met in the practical application of sanitary principles to various trade processes.

Yearly congresses and health exhibitions have been held under the auspices of the museum in different cities of Great Britain since its foundation and with most excellent results.

The first health exhibition and congress, held in Leamington in 1877, has been followed by others in the principal cities of England, Scotland, and Ireland. The exhibition this year will be held in Birmingham from September 27 to October 22.

The classification of exhibits will be embraced under the following divisions:

A. Science in relation to hygiene.
B. Hygiene of special classes, trades, and professions.
C. Construction and sanitary apparatus.
    Class 1. Building material, construction, and machinery.
    Class 2. Water supply and sewerage.
    Class 3. Heating, lighting, and ventilating.
D. Personal and domestic hygiene.

These exhibits are referred to in order to explain the extent of the work the Sanitary Institute accomplishes each year outside of London. The advances that have been made under its supervision in all branches of sanitary science and the benefits derived from it by the State can only be determined by personal examination of the improvements in water supply, drainage, sewerage, etc., in the different cities mentioned, and study of the extensive literature on the subject.

The following pamphlets, etc.,* accompany this report:

1. Opening address of the president of the Ninth International Congress of Hygiene and Demography.
2. The military hospitals of the Island of Cuba, with 19 plates, 1898. Distributed to members of the congress.
3. Blank forms used in military hospitals, Madrid.
4. Catalogue of ambulance material, hospital tents, military equipment, etc., ashore and afloat, furnished by H. Lefevre, 10 Rue Erard, Paris.
5. Descriptive Catalogue of Exhibits of Parkes Museum, 1897.
6. Illustrated list of exhibits to which medals have been awarded, with price list, 1897.
7. Knight's Series of Diagrams of Hygiene and Sanitary Science, with Desriptive Notes.
8. Price lists of models, etc., relating to hygiene.

The catalogue of exhibits of Museum of Hygiene and price lists are forwarded for the information of Bureau of Medicine and Surgery. Purchases can be made direct or through B. F. Stevens, No. 4, Trafalgar square, London.

I beg to request a set of photographs of the United States Museum of Hygiene, Washington, D. C., and catalogue of exhibits be sent to E. White Wallace, F. S. S., secretary Sanitary Institute, 72 Margaret street, London, England.

The officers of the museum gave me every opportunity and assistance to obtain the information desired.

MEDICAL REPORT OF THE OPERATIONS OF THE NORTH ATLANTIC SQUADRON IN THE WAR WITH SPAIN.

By C. U. GRAVATT, *Medical Inspector, United States Navy.*

I respectfully submit the following medical report of the operations of the North Atlantic Squadron in the war with Spain, now practically concluded:

War was declared April 21, and at 4 a. m. of the 22d the squadron left Key West to establish a blockade of Havana, Matanzas, and other Cuban ports. It consisted at the time of the *New York* (flagship), *Iowa* and *Indiana* (battle ships), *Terror* and *Amphitrite* (monitors), the cruisers *Detroit*, *Marblehead*, *Cincinnati*, *Nashville*, and *Montgomery*, and several small craft.

The first engagement occurred at Matanzas on April 27, when the *New York*, *Cincinnati*, and *Puritan* bombarded the batteries to develop their location and strength. No injury was received on our side.

By this time additions brought the force up to about 40 vessels, carrying 7,000 officers and men.

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* Placed in the library of Naval Museum of Hygiene, Washington.

After the affair at Matanzas, blockading stations were resumed until May 4, when a squadron, consisting of the *New York*, *Iowa*, *Indiana*, *Detroit*, *Montgomery*, *Amphitrite*, *Terror*, and torpedo boat *Porter*, proceded to San Juan, Porto Rico, in the hope of encountering the Spanish fleet under Admiral Cervera, whose movements had been elusive. Arrival there was timed for daylight on the 12th, when an active bombardment was begun and maintained for nearly three hours. Our fire was fiercely returned, but with such indifferent aim that only two shells took effect—one on the *Iowa* and one on the *New York*. The former wounded 3 men, one being a compound badly comminuted fracture of the right elbow. The wound was cleared of small fragments and dressed on board in the hope of preserving some use of the forearm, but two weeks later amputation was done at the army hospital at Key West. On the *New York*, 1 man was almost instantly killed by a fragment of shell entering at left mastoid process, traversing the brain, and fracturing the occipital bone. Another had a compound comminuted fracture of the left femur an inch and a half above the knee. Notwithstanding much shattering, fragments were removed, the bone ends smoothed off and wired together, and a plaster splint was applied. The patient was transferred to the *Solace*, thence to the army hospital at Key West, and subsequently to the naval hospital, New York. Firm union resulted, and he will have a useful leg, with 2 inches shortening. Healing was by first intention. Three other men were struck, but not badly hurt. In more than one of these cases a lack of local vitality was observed, as though the shell fragments were hot and charred the tissues. Surgeon Streets informs me that similar observation was made on the *Solace* in shell wounds. On May 11 several cutters belonging to the *Marblehead* and *Nashville* were sent inshore off Cienfuegos to cut a cable leading from that port. When within easy rifle range from the beach volleys were poured into them by concealed enemies, wounding 7 of the *Marblehead's* crew and 3 of the *Nashville's*. It is surprising that any escaped. Of the three wounded in the head, one died. One man was shot through the liver, and another had a leg fractured. The other wounds, mostly of the lower extremities, were not serious. Lieutenant Winslow had the joint of a finger perforated on board of the *Nashville*, and the commanding officer was struck over the heart, but the bullet did not penetrate.

The same day the torpedo boat *Winslow* was fired upon off Cardenas by a masked battery, and Ensign Bagley and 4 men were killed and 5 wounded. No details of these cases have been received by me, but as only 2 of the wounded were returned from the Key West hospital the others were probably trivial.

On June 13 the auxiliary cruiser *Yankee* encountered a Spanish gunboat off Cienfuegos and had 1 man struck by a fragment of shell, fracturing the left clavicle and spine of scapula and carrying away the tissues of the upper aspect of shoulder. Subsequent history of this case is unknown to me.

On the 10th of June a landing was effected at Guantanamo Bay by 650 marines supported by the *Marblehead*. The Spaniards retired without opposition and the hill upon which they had been located was at once occupied and became known as Camp McCalla. It was surrounded in all directions, except the water side, by dense undergrowth approaching close to the camp, and from this the enemy kept up a desultory fire for several days and nights. On the 19th an attack was made on them at Casco, 3 miles from the camp. They were dislodged and no further fighting occurred. Including this engagement the total loss among the marines was 6 killed and 16 wounded. Among the former was Assistant Surgeon John B. Gibbs, who was shot through the head and almost instantly killed. He was buried near the center of the camp. Of the above casualties several were self inflicted owing to lack of familiarity with the Lee rifle.

Immediately after landing, the huts and houses that had been in use by the Spanish were burned, as a precaution against yellow fever, and the following general order, issued at the request of the fleet surgeon, was put in operation, with the satisfactory result that two and a half months later, when the army was suffering from yellow fever, typhoid fever, and severe malarial fever it could be said of the marines that they were in better condition for service in Cuba than upon their arrival.

SQUADRON GENERAL ORDERS, No. 11.

Naval landing parties shall observe the following sanitary regulations:

1. No water shall be used for drinking or cooking purposes except after having been boiled for 15 minutes. Cooking utensils and dishes used to contain food should be washed in boiled water.
2. Clothing to be as light as possible, and when wet by rain or perspiration, changed as soon as practicable. In no case should wet clothes be slept in.
3. Do not sleep on the bare ground or without cover.
4. When exposed to a hot sun the men should wear some fresh, green leaves inside their hats or caps.
5. During the heat of the day only absolutely necessary work should be done.
6. Medical officers shall make thorough inspection daily of all parts of the camp, and report defects or inattention to these regulations to the commanding officer.

CAMPING SITES.

Camping sites are to be chosen by the commanding officer after consultation with the senior medical officer.

Camps should be pitched on dry, elevated land, remote from and to windward of marshes, with hills or trees intervening, if possible. Tents should have their openings facing away from the marsh.

No site is to be used as a camp or halting station that has been used for the same purpose previously, if it can be avoided.

Buildings should not be used generally for quartering men.

All hospitals and church buildings in Cuba are probably infected, and should not be used. Private residences of the higher classes and public administration buildings are likely to be the freest from infection.

WATER SUPPLY.

Water from the streams and wells is always suspicious, and should be boiled well before using for drinking and cooking purposes, thus preventing typhoid fever and probably malaria and dysentery.

FOOD.

The food will be the regular Navy ration. Fruits which are ripe and sound, and which are skinned or cooked before eating, are not objectionable. Lime and lemon juice should be used freely.

LATRINES.

Latrines are to be placed to leeward and below the camp, away from the water supply. Dry earth or sand to be scattered over the contents of the pit every morning.

SWEEPINGS, ETC.

All refuse from the camp should be deposited in a chosen place and destroyed by fire, as should all enteric and dysenteric discharges. Grounds and tents to be kept thoroughly clean and inspected daily by a medical officer.

QUARANTINE.

The whole camp should be virtually in a state of quarantine against the natives and persons coming from an infected district, and intercourse allowed only under special regulations made to prevent the entrance of yellow fever.

W. T. SAMPSON,
Rear-Admiral, Commander in Chief United States Naval Force,
North Atlantic Station.

The battalion finally broke camp August 4 to go to the Isle of Pines, but hostilities ceasing it went north, arriving at Portsmouth, N. H., August 24.

In an engagement with the Santiago batteries on June 22, the *Texas* had one man killed and eight wounded. Two of the latter were serious, viz, a lacerated wound of left hip, and the other serious more from the number of wounds than the bad character of any, according to the report of the medical officer, "numerous wounds, right thigh, left leg and ankle, left eye, etc."

General Shafter's army began landing at Daiquiri June 22, and continued it there and at Siboney for several days under cover of the fleet. The writer saw the chief medical officer—Colonel Pope—and others, and urged them to burn the buildings and huts at those points, which were generally very dirty, and from the character of their former occupants, mostly railroad hands and soldiers, and from the proximity to Santiago, where yellow fever was known to have been severe last year, there was good reason to believe they were infected. Just when the first case occurred has not been ascertained definitely, the *New York* being about that time at Guantanamo, but it soon assumed such proportions that the torch was applied. The Commander in Chief was requested to issue the following general order:

NORTH ATLANTIC STATION,
UNITED STATES FLAGSHIP NEW YORK (1ST RATE),
Santiago de Cuba, Cuba, July 14, 1898.

SQUADRON GENERAL ORDER NO. 14.

1. In consequence of the prevalence of yellow fever among the Army, especially at Siboney, no communication is to be had with that or other point occupied by the Army except such as military necessity may require. Where communication can be had by signal, that method is preferable. No one from an infected point, or who has had contact with the Army, shall be allowed on board any vessel except when required as above and then due precautions against infection shall be taken. Intercourse with Cubans shall be reduced as far as practicable. Prisoners to be thoroughly disinfected and their clothing destroyed. In fine, nonintercourse, as complete as possible, shall be observed.

2. On shipboard opportunities for bathing and changing wet clothing are to be afforded the men. They must not sleep in wet clothing, nor in clothing worn during the day, and awnings shall be spread when the exigencies of the service allow.

WILLIAM T. SAMPSON,
Rear-Admiral, Commander in Chief United States Naval Force,
North Atlantic Station.

The precautions against infection alluded to in this order consisted in each person who had been exposed at once taking a shower bath and then a sponge bichloride bath upon returning to the ship. Clothing was either immersed in bichloride solution 1:1000 or exposed to the sun for a number of hours.

Even with communication restricted to military necessities, much exposure was unavoidable. Parties of insurgents often visited the ship for consultation, and frequently large bodies of them were transported from one point to another. No great apprehension was felt regarding them, however, as they usually came from the interior or places along the coast remote from towns. After the fall of Santiago, on July 17, a good deal of direct communication with the city was required, and five captured steamers, which had been in the port for months with their crews and others on board, had to be taken charge of and prize crews put aboard. The accompanying report of Passed Assistant Surgeon Berryhill, who was given charge of their sanitary preparation, explains the state in which he found them and what was done to put them in a safe condition for service. This duty was unhesitatingly accepted by Dr. Berryhill, though there was good reason to suppose the operation of breaking out these vessels would be attended by much personal danger.

It also became necessary to establish port quarantine at Guantanamo Bay, which was efficiently carried out by Passed Assistant Surgeon Wentworth, of the *Marblehead*. Commander McCalla, who was in immediate command of the station, took an active interest in its maintenance This comprised more than inspection of vessels from Siboney, Daiquiri, and, later, from Santiago, for constant intercourse with Cubans and frequent communication with Caimenara and Guantanamo, through Spaniards who surrendered themselves, necessitated vigilant care.

By the 1st of July the squadron strength had grown to 105 vessels, carrying 15,000 officers and men, exclusive of over 20 colliers and 2 supply ships, and its operations extended over more than 2,000 miles of Cuban coast, the north coast of Porto Rico, and Key West; besides which a number of vessels were always on detached duty.

In response to a request for medical assistance by the Army, owing to the stress upon it after the battles before Santiago, Surgeon Simons and Assistant Surgeons Elliott and Spear were ordered to report at the hospital at Siboney on July 2. Dr. Simons returned to his ship the following day, the others remaining until the 5th. Upon their return, Assistant Surgeons Costigan, Grove, and Haas were sent for several days. All of these officers rendered valuable and appreciated aid. The scope of their work may be judged from the appended reports of Drs. Costigan, Elliott, and Spear. Their remarks upon the character of wounds made by the modern rifle bullet accord with my own observation. At very close range the exit wound is nearly always large, radiated, and tumefied, even when soft parts alone are traversed.

From July 6 to 12 Surgeon A. T. Mitchell, Revenue-Cutter Service, attached to the *Manning*, took care of the Army force at Daiquiri in the absence of army medical officers. His report is appended. In connection with his remark about the drinking water, it is worthy of note that the two naval vessels that suffered most severely from malaria, the *Scorpion* and *Vixen*, took water there.

On the 3d of July the famous naval engagement off Santiago took place, in which four Spanish cruisers and two torpedo boats were destroyed, with the loss, on our side, of one man killed and one wounded—both on the *Brooklyn*. The number of casualties on the Spanish side will probably never be accurately known; but, with an approximate knowledge of the complement of their ships and the number of prisoners taken, an estimate of between 400 and 500 killed, wounded, and missing is made. Doubtless some were drowned by jumping from the burning ships. A much larger number were suffocated. Over 50 wounded were recovered, and, after being first attended to on the *Iowa*, *Oregon*, and *Gloucester*, were transferred to the *Solace*. These wounds were all bad, and, as Surgeon Streets informs me, became infected, probably by particles of clothing.

When the Spanish fleet emerged Surgeon Simons was returning from Siboney to the *Iowa* on a newspaper yacht, but no inducement would tempt the captain of the yacht, who was a little gun shy, to put the doctor alongside until the firing ceased. Fortunately Simons found no need of his services among his own men, but, with Passed Assistant Surgeon Crandall, was busy all night with the Spanish wounded, as will be seen in his report hereto appended.

Soon after the above event most of the ships that had been operating around Santiago assembled at Guatanamo to overhaul, and remained there until the announcement of the cessation of hostilities. On August 14 the armorclads proceeded north, and, with few exceptions, the rest of the squadron was soon withdrawn from Cuban waters, some going to Hampton Roads, some to New York, and some to Boston.

The total killed in action, according to reports received, was 14, and total wounded 41. Several accidental gunshot wounds occurred, two of which are known to have been fatal, both abdominal. One was a member of a prize crew going to Key West, and no surgical assistance was available. The other, on the *Brooklyn*, was a shell wound, in which the descending colon was badly torn. Laparotomy was performed, but septic peritonitis ensued. Another case involving laparotomy happened on this ship, the details of which have already been reported. Two men were seriously wounded on the *Wilmington* by the explosion of a 1-pound shell they were examining, the results of which are unknown to me, and a man on the *Indiana* was shot through the calf of leg by the accidental discharge of a revolver.

There were two suicides, neither of which had anything in connection with duty as its cause.

One of the most practical lessons taught by the war, ashore and afloat, and about which all observers are agreed, is the importance of a competent first dressing in preventing wound infection. Where this was made wounds did remarkably well, notwithstanding unfavorable surroundings. Dressing materials should be more abundant and always the best that can be had. Effort has been made to frame a war allowance on the basis of the quantities found necessary in actual practice for shell wounds, but up to this time I have been unable to get the figures. However, at least 10 per cent of casualties should be allowed for, and if vessels should be operating remote from a base of supplies this allowance should be increased to 20 or 25 per cent.

HEALTH OF SQUADRON.

It is estimated from data at hand that the average daily loss of strength from disease, casualties in battle, and the ordinary injuries incident to ship life was about 2.5 per cent. That such a result was obtained after long confinement on shipboard and sameness of diet (for several of the larger ships had been practically on a war footing for months) during a tropical summer, without awnings and with air ports closed by battle plates at night, must be regarded as remarkable. There can be no doubt it was largely contributed to by the magnificent spirit of the men, enabling them to withstand or ignore petty ills to which, under ordinary circumstances, they would have yielded.

The mortality from disease is not accurately known to me, but was small. About 330 cases were treated in the Key West hospitals between May 13 and August 13, 59 remaining at the last date. Just what number of these were returned to duty or sent to Northern hospitals is not known to me, the final disposition of cases not being stated in the reports received. Fifty-nine belonged to the acute infectious-disease class, viz, 2 cachexia malarialis, 2 catarrhus epidemicus, 1 diphtheria, 2 dysenteria acuta, 3 erysipelas, 8 febris intermittens, 7 febris remittens, 5 febris pneumonica, 15 morbilli, 9 rheumatismus acutus, and 5 tuberculosis pneumonica; 26 to diseases of the nervous system; 23 to diseases of the digestive apparatus; 42 to the genito-urinary apparatus; 55 to injuries, and the rest scattering. One case transferred from the *Yankee* as with appendicitis and operated upon was, after death, called yellow fever, a diagnosis not borne out by investigation. Eleven of the 15 cases of measles occurred in the marine battalion immediately after the arrival at Key West on the *Panther*. As soon as the battalion was landed and encamped (at Key West) the disease disappeared. The other 4 cases were sent from the *New Orleans* also immediately after the arrival from New York. In like manner 5 cases occurred on the *Yankee* at Guantanamo after a trip to New York. Bedding and clothing being exposed to the sun and the berthing space scrubbed, the trouble was promptly arrested.

The largest number of patients were contributed by the *Lancaster* (23), *Panther* (20), *Amphitrite* (17), *Puritan* (15), *Machias* (14), *Cincinnati* (9), *Vicksburg* (8), *Castine* (8). Thirty-three cases went from torpedo boats, which is a heavy percentage of their total complement, but is not surprising in consideration of the arduous service these men performed. Twenty-three cases went from tugs and colliers, leaving 160 cases for the rest of the fleet, representing an average of over 10,000 men. Some, though not a large number, were sent direct to the *Solace* from the blockading vessels, and a few were sent north by chance opportunities.

The most interesting and important occurrence from a medical standpoint was the following: Cases of acute intestinal disturbance began to develop soon after anchoring in Guantanamo Bay. There was fever, pains in back and limbs, a sense of great weakness and almost collapse in some cases, persistent diarrhœa, nausea, and vomiting, and in nearly every case pain on pressure over splenic angle of the colon. Those cases having the most profuse diarrhœa had the least fever, indicating elimination. The disease usually ran its course in four or five days, the weakness persisting. Everything of a general nature which was thought possible to cause it was investigated. As similar cases were occurring on all the ships in the harbor, it was evident some common cause must be at work, and the fresh meat coming from the supply ships was the only thing common to all. The meats when received on board were frozen and hard to cut up. For this reason they were often left on deck over night to thaw out. They were then cut up, placed in cold storage, and used by the messes as required. After being distributed to the mess cooks, they were allowed to lie in the heat several hours before being cooked, and while so exposed myriads of house flies, which infested the ships in Guantanamo Harbor, had access to them. As the same meats were used on board during the blockade of Santiago, when the ships were free from flies and no disturbance followed their use, it is thought that these insects were a potent factor in causing the condition of the meats which produced the disease. Specimens of the meats were taken for examination. The flesh was apparently quite fresh, free from odor of decomposition, and in excellent condition. Microscopic examination showed that the areolar tissue was filled with microorganisms of many species. The conclusion arrived at is that the cases were due to a ptomaine poison produced in the meats by the organisms found, and that the flies were carriers of the germs.

REPORT ON THE HOSPITAL AND AMBULANCE SHIP BAY STATE.

By C. A. **Siegfried**, *Medical Inspector, United States Navy.*

This complete hospital ship, sailing under the laws of the Geneva Red Cross Convention, was commissioned by President McKinley June 23, 1898. She was purchased by the State of Massachusetts from the Boston Fruit Company for $50,000, and was reconstructed, equipped, and maintained by the Massachusetts Volunteer Aid Association. She was originally in the fruit trade, plying between Jamaican, West Indian, and our home ports, and, after a thorough inspection upon her last arrival at Baltimore, she was considered to be a suitable vessel for the purposes of a hospital ship (within the limits of cost provided) by Medical Inspector C. A. Siegfried, United States Navy, who was appointed by the President to control her fitting out and equipment.

She was at once taken to the Atlantic Shipbuilding Works in South Boston, and after some delay, due to the necessary formalities of legislation and purchase by the State, the work of reconstruction and fitting was commenced. After about five weeks of hard, continuous work she was completed, and on Saturday, August 6, she sailed on her first trip for Santiago, Cuba. On the 30th of August she returned to Boston with 99 sick and wounded men, 2 having died en route. Since that time she has continued at work transporting the sick from Porto Rico, preferably the men of the Massachusetts volunteers, but making no distinctions.

Being a fruiter her hull was not much broken up by subdivisions and compartment bulkheads, and she thus offered a free internal space for the new hospital design and constructions, the materials being mainly steel, iron, and the old decks covered with hard pine, excepting where asphalt and cement were used. Thus, in fact, the essential new work and the hospital construction in detail, including berths, lavatories, baths, closets, storerooms, operating room, and ice and refrigerating plant insured the very desirable aseptic conditions.

Very general assistance in every part and detail of the ship was given by the medical men of Boston, by professional engineers, Professor Hollis, of Harvard University, and Consulting Engineer Boyd, of the Atlantic Works, who was in charge of construction, and by the members of the executive committee of the Massachusetts Volunteer Aid Association. The result, as seen in the completed vessel and her work since, has amply fulfilled all expectation, and has given great satisfaction and pleasure to all concerned.

The *Bay State*, originally the *Bowden*, was built in 1886, by Scott & Co., in Bowling, Scotland, of three-eighths-inch steel, and is rated in Lloyds 100 A 1. Bark rig, single screw. Length over all, 200 feet. Width, maximum, midships, 27 feet. Draft, maximum, 14 feet. Speed, 12 knots; economical, 10 knots. Steaming radius, 3,000 miles. Coal capacity, 180 tons. Displacement tonnage, 774 tons; net, 388 tons. Depth of hold, 22 feet. Decks, light flying (added in Boston): Upper, spar deck. Main, hospital deck. Orlop and half deck. Fore and after holds. Engines: Triple expansion; three cylinders, 20, 33, and 53 inch by 36-inch stroke; 71 revolutions. Two main Scotch boilers; one auxiliary. One fire room. Indicated horsepower, 825. Nominal horsepower, 150. Boats: One 30-foot launch, alconaphthol; four 24-foot pulling boats, and one 12-foot gig. Personnel and complement: Deck force—captain and two mates, quartermasters and seamen (11); engine room—chief engineer and three assistants, machinists, and coal passers (12). Medical and hospital—one surgeon superintendent, four assistant surgeons and physicians, six female nurses, six male nurses (17). General attendants, scrubbers, etc. (13). Purser, steward's department, cooks, etc. (8). Total, 61. Fixed berths: Contagious ward, 18; (double tiers) forward hospital ward, 50; midship hospital ward, 36; on lower deck ward, 20. Total, 124. Maximum capacity by trebling berths in part, 150. Berths of 1-inch iron piping, 24 by 74 inches, white enameled, with wire springs and hair mattresses.

Baths and lavatories: Three on hospital deck and three on upper deck. Bowls with syphon hopper traps, with an additional valve to drain through ship's side, placed above water line.

Water condenser with filter, Riley patterns, with capacity of 3,000 gallons daily.

Electric dynamos and lighting; 200 lights.

Ice machine and refrigerating plant, by the Henderson Company, Carbondale, Pa.; market price, $6,500; capacity, with external temperature of 80° to 90° F., 5,000 pounds of ice; one cold room, 1,500 cubic feet, 34° F., and one of 750 cubic feet at 24° F., with an external temperature of 70°; ice capacity 5 tons daily, and the cold rooms at 34° and 24° F. Ice storage, 200 cubic feet. Chemicals and materials used: Anhydrous ammonia and calcic chloride brine of sp. gr. 1.200. Head pressure in cylinders and coils, 180 to 200 pounds. Machine room (with separate fan blower and ventilating system, and with pump to remove fumes and waste chemicals) inclosed in $\frac{5}{16}$-inch steel compartment.

Laundry: One washer, one wringer, and small engine; capacity, equal to do ship's hospital laundry in twenty-four hours.

Ventilation: All parts of ship, below the spar deck by system of tubes, and one Sturtevant fan blower (70 inches); 400 revolutions per minute. The very numerous air ports in ship's side on hospital deck, 10 by 12 inches diameter, two large hatches and two smaller ones, amply suffice in the usual moderately fair weather. Electric fans arranged for berths in the proportion of one to every four.

Operating room, with steam sterilizer, fixed table, and the usual surgical and medical appliances, including X-ray portable apparatus, hot and cold water, etc.

Steam disinfector, 36 by 48 inches dimensions. Capacity, 12 mattresses. Ship's bedding and linen sterilized in twenty-four hours.

Operating room, laundry, and disinfector compartment decks, asphalted.

Storerooms, total capacity, upward of 4,000 cubic feet. Usual beef storage in cold rooms, 10,000 pounds.

Cooking range and galley of modern design and construction, bricked floor, steam appliances, etc., on the upper deck. Dumb-waiter to serving tables or kitchen on hospital deck.

Forecastle for crew of 17 men, equally fitted in metal-pipe berths, new fittings, and comforts for the men.

Baths for patients on hospital deck, with hand bowls, of porcelained steel, supplied with hot and cold water, including sea water. Multivalved supply stand pipe. Baths stand uninclosed.

Relative cost of ship, calculated to unit of fixed berth, as finally completed and equipped, $1,200.

Appliances for transport of patients include fixed booms at masts on deck, plain stretchers, the United States Navy cots, Lowmoor jacket stretchers, and the berths themselves, which are removable. The boats have proved amply serviceable, and the four of lifeboat pattern with the alconaphthol launch have admirably sufficed for the water transport thus far.

The ship is also equipped with a competent piping and hose system for fire purposes.

On the 6th of August, the day of her first departure from Boston, certificate of inspection, according to instructions and orders from the Navy Department, and in accordance with Article XIII, Geneva Red Cross Convention, was issued by Medical Inspector C. A. Siegfried, United States Navy.

REPORT ON THE UNITED STATES AMBULANCE SHIP SOLACE.

By Thomas H. Streets, *Surgeon, United States Navy.*

On May 7 the *Solace* left the navy-yard, Norfolk, Va., and arrived at Key West, Fla., May 11. Immediately after our arrival at the latter place orders were received to report to Admiral Sampson, off San Juan de Porto Rico, and we joined the fleet May 14, two days after the bombardment of the fortifications of San Juan.

Four patients, three of whom had been wounded in the engagement of May 12, were received on board and invalided to the Convent Army Hospital at Key West on the 20th of May, their wounds being in good condition when transferred.

On June 1, 53 sick and wounded of the Navy were received from the army and marine hospitals at Key West and from the vessels at that time in that port, for transfer to the naval hospital, New York. Sixteen of these patients were surgical cases and included four wounded (from the *Marblehead* and *Nashville*) in the engagements off Cienfuegos. On June 5 all these patients were landed at the navy-yard, New York, none of them having died on the passage north, and most of them being in a greatly improved physical condition.

On June 8 the *Solace* started south again, reaching Guantanamo Bay June 13, and our arrival was most opportune for the beleaguered marines, who were fighting bravely to maintain their position at Camp McCalla. The ship remained continuously at anchor in Guantanamo Bay for nineteen days—until the position established by them was safe from attack—in order to render assistance to the wounded marines. During this period 25 wounded marines and sailors and 31 sick patients were received on the *Solace;* and on July 3 orders were received to proceed to the fleet off Santiago de Cuba and receive the wounded of the naval engagement of that day. We arrived before daylight of the 4th and received from the vessels of our squadron 59 wounded Spaniards. Others were received later at Guantanamo, and some of those taken on board off Santiago were transferred as not being fit subjects for hospital treatment; so that the number of Spanish patients finally settled down to 53—48 men and 5 officers. Many of these wounded were in a very bad condition. They were lacerated and burned, and the wounds of all were badly infected. One died while being taken on board, and five others while under our care. There were landed at the naval hospital, Norfolk, 42 men and 5 officers.

On our return to Guantanamo Bay we received on board 22 sick and one wounded—the latter from the *Brooklyn*—the only man wounded in the engagement of the 3d of July. Among the sick were three men from the *Hornet*, who had broken into and drank the liquid contained in the tank of the naphtha launch belonging to the New York Herald. This liquid was said to be a mixture of wood alcohol and benzine. One of the men was moribund when brought on board, and died about two hours afterwards. His death was apparently due to poisoning of the respiratory center. The second case recovered with complete loss of sight and with the pupils widely dilated. There was no improvement in his vision eleven days afterwards, when he was transferred to the naval hospital, Norfolk. The lesion was evidently central. The third man was returned to duty. The chief seat of his trouble seemed to be the stomach. I am not aware of the existence of any literature on the effects of this poison. This case was the first death occurring on the *Solace* among our own men.

During this trip the *Solace* was used as a hospital ship. There were received on board of naval patients 79 cases, 20 of whom were returned to duty, and 57 were carried north and transferred to the naval hospital, Norfolk, Va., and 2 to the naval hospital, New York.

On July 10 we proceeded to Altares and took on board 39 enlisted men and 5 officers of the army for transportation north. These patients were received from the base hospital at Siboney and from the army hospital steamer *Relief*. They were mostly gunshot injuries. We left Guantanamo Bay July 12, and arrived at Norfolk, Va., July 16. The army wounded were landed at Fortress Monroe, and the sick and wounded of the navy and the wounded Spaniards were transferred to the naval hospital, Norfolk. There were no deaths among the sick and wounded of the army and navy. Of the 79 naval sick 26 were wounded. In addition to those mentioned, we received and treated on board the *Solace* four Cubans of the insurgent army. Two of these were gunshot injuries. Some of the wounded marines were received from the fighting line with the first-aid dressings undisturbed. Our experience with these demonstrated the value of first-aid dressings. In none of them was there any sepsis in the course of their treatment. It is very gratifying to be able to record our perfect success in the aseptic treatment of wounds. In no instance were we obliged to sacrifice a limb. It is a triumph to conservative surgery to be able to save limbs so long as the blood vessels and nerves are intact.

The *Solace* left New York on her next trip south August 2, and arrived at Key West, Fla., August 7. There were received on board from the army and marine hospitals, and from the vessels in port, 16 patients, one of whom was a sailor with a broken leg, from the army transport *Iroquois*.

After leaving Key West, we visited the blockading squadron off Havana and the vessels doing blockading duty along the north coast of Cuba, receiving their sick and distributing medical supplies, reading matter, fruit, tobacco, delicacies, and articles of comfort, and arrived in Guantanamo Bay August 12. We remained there until August 24, awaiting the arrival of the sick from the fleet at Porto Rico. August the 17th there were transferred to us from the *Badger* 3 soldiers from the Thirty-fourth Michigan Volunteers. These men were so seriously ill that it was not considered safe to send them north on the *Badger*. They were typhoid fever cases from Santiago. One died before we left Guantanamo Bay, and was buried on shore at Camp McCalla.

We arrived at Boston, Mass., August 29, after a passage of four days and sixteen hours, and transferred to the naval hospital at Chelsea 75 sick, all that we had started with from Cuba. They were all much improved in health.

During this trip a number of cases of malarial fever were received on board from the small vessels doing duty on the south coast of Cuba. Microscopical examinations revealed the presence of the malarial organism in the blood. In every one of these cases the source of infection could be traced to drinking water taken on board at Daiquiri. In the case of the *Scorpion* a large percentage of her crew was infected. The fleet surgeon ordered the Daiquiri water pumped overboard and the tanks washed out with condensed water. No new cases appeared after this proceeding. This practically proves the water-borne character of malarial infection.

Asst. Surg. Edward V. Armstrong, United States Navy, and attached to the *Scorpion*, in response to my inquiries wrote as follows:

> We first filled our drinking tanks with drinking water on the 9th of July, at Daiquiri. Fever appeared the week beginning July 21, and by the 28th of July I had 12 cases on the sick list, or about 10 per cent of the complement of the ship, and perhaps a dozen more who complained of malarial manifestations.
>
> We refilled our tanks on our return from Manzanillo, but on reaching Guantanamo Bay the following day, August 11, we pumped it all overboard.
>
> Since about August 20 I have had to do only with relapses, and no new cases.

The date of this letter is September 29.

The *Solace* again left New York September 22 and arrived at Gibara, on the north coast of Cuba, September 27; received sick from the *Nashville* and proceeded to Guantanamo Bay the same day, arriving September 28.

After transferring the sick from the *Newark*, *Vulcan*, and *Glacier*, and three men of the Merritt & Chapman Wrecking Company, sick of malarial fever, we went to Port Antonio, Jamaica, where we received the sick from the *Scorpion*. From thence we went to Ponce, Porto Rico, arriving October 1. Here we took on board 46 army sick. Twenty-four of these were typhoid fever cases and 7 malarial. Most of these patients were emaciated to an extreme degree. In anticipation of having many cases of fever to deal with during this cruise, P. A. Surg. Charles F. Stokes procured from the Hoagland Laboratory, before leaving New York, pure cultures of typhoid fever and yellow fever. The former of these cultures was used with great success in diagnosing the cases of typhoid fever.

From Ponce we went to San Juan, where we received the sick from the *Cincinnati*, and left for New York October 3, where we arrived October 8. The 46 soldiers, much improved in strength and appearance, were transferred to the army representative at Tomkinsville the same day. The naval sick were transferred to the naval hospital, New York, and the men of the Merritt-Chapman Wrecking Company went to their homes.

Total sick received on board the *Solace* for treatment and transportation, 379. Of this number 8 died, 6 of whom were Spanish wounded, 1 a soldier and 1 a sailor. The *Solace* went prepared to embalm and to carry home any soldier or sailor who might die on the passage north, but we never had occasion to perform this service.

In addition to the receiving and caring for the sick, the *Solace* had another mission which endeared her to all and made her coming as welcome to the well as to the sick. The additional work was to distribute the large donations of the many relief associations throughout the country. From the same sources there were received, through the Surgeon-General of the Navy, enough money to subsist all our sick and wounded on fresh meat, chicken, eggs, fruit, ice, and other delicacies, without any expense to the Government. Medical supplies were furnished when needed to all the vessels visited. So generously have we been provided, both by the Government and by the public, we have not been allowed to have a wish long ungratified.

I can not give too much credit for the good results obtained to my able assistants, P. A. Surgs. Charles F. Stokes, G. Tucker Smith, and Edward S. Bogert. Every member of the Hospital Corps has performed his duties in the most efficient manner. Every effort of mine has been cordially seconded by Commander A. Dunlap, United States Navy, the commanding officer of the *Solace.*

REPORT ON THE HEALTH OF THE PORTS OF BAHIA AND PARA, BRAZIL.

By J. C. BYRNES, *Surgeon, United States Navy.*

In compliance with Article 683, United States Navy Regulations, I have the honor to report upon the health of the two ports of Brazil, Bahia and Para, visited by this vessel during the recent cruise from Montevideo, Uruguay, to this port.

Bahia was reached at 8.10 p. m., on February 2, after a run of seven days at sea. The ship was not visited by the health officer till the following morning, at which time it was learned that both yellow fever and smallpox prevailed in the town; and in the harbor yellow fever on board an English barque, where three cases existed. It was also learned from the same source that the mortality among the natives from yellow fever and smallpox had been very great; it was impossible to obtain in numbers just how heavy it had been. The epidemic of both diseases started the latter part of September and reached its height in December, when it began to wane.

The ship was quarantined against the shore, except so far as coal and provisions were concerned. The former was obtained from lighters anchored at a distance from the city on the opposite side of the harbor; the latter were obtained through the medium of a comprador.

But four officers visited the shore on duty, the commanding officer, navigator, aid to commanding officer, and myself. The visit in each instance was of brief duration and confined strictly to the matter in hand.

The temperature conditions were extreme; the mean difference between the wet and dry bulb thermometers during our stay of four days was 3° F. Great depression was manifest among the officers and crew. Heavy rain squalls were frequent during the twenty-four hours of each day, which added greatly to the general discomfort.

Owing to the serious insanitary conditions of this port, the commanding officer cabled the American consul at Para, inquiring the sanitary conditions there. The reply was very satisfactory to the consul.

On February 6 the vessel started for Para, and on the 12th anchored over 3 miles below the city. The following morning the health officer visited the ship, and brought with him a young Englishman to act as interpreter. Being suspicious of the accurateness of the cable received from the American consul before leaving Bahia, an interview was had with the interpreter while the health officer was making out the necessary papers granting the ship pratique. From him it was learned "a few cases only of yellow fever and smallpox existed in the town, otherwise the city was very healthy." The health officer pronounced the city as being "absolutely free from contagious and infectious diseases," and gave the ship pratique accordingly. This statement being totally at variance with the Marine Hospital report for November, as set forth in the New York Medical Record; differing from that of the health officer at Bahia and the statement of the young Englishman, I recommended that the ship be quarantined against the port with the exception of coal and necessary provisions.

The wisdom of this step was shown in one of the daily papers which reached the ship later in the day. The statistical report for the month of January, 1898, published 38 deaths from yellow fever, 8 deaths from "American typhoid" (a term used to lessen unusually large numbers of deaths from yellow fever, which I was told by the American consul), 2 deaths from confluent smallpox, a large number from gastro-enteric and hepatic troubles. This report increased the vigilance of quarantine against the shore.

Before I close with the matter of misrepresentation on the part of the authorities here, I will add the certificate of the British consul at Para, embodied in his bill of health furnished the ship for the British West Indies, which bears out my statement, further strengthened by the daily papers of Para:

> There have been 18 deaths from yellow fever in this city during the previous fourteen days, making a total of 25 since February 1, 1898. This is also to certify that none of the crew or officers of the *Cincinnati* have been ashore at Para.
>
> Given in Her Britanic Majesty's consulate at Para on the 18th day of February, 1898, in the year of our Lord.
>
> WM. A. CHURCHILL, *H. B. M. Consul.*

No mention was made of smallpox.

The authorities of Barbados quarantine for a period of fourteen days all vessels arriving from Para. The above certificate of the British consul enabled the ship to receive pratique without delay.

During the vessel's stay at Para the climatic conditions were very trying, both upon officers and men. The thermometric conditions were extreme, and but one-half degree's difference between the wet and dry bulb thermometers. Regularly every day, between the hours of 1 and 2 p. m., a heavy rainfall would occur, which would continue to the close of day, frequently well into the night. These conditions were especially trying upon the men who for sanitary reasons were compelled to sleep below in the different living spaces, where the daily mean temperature ranged from 86° to 97° F. The dews of the night, when not raining, were always heavy. Numerous islands and the river banks were in close proximity to the anchorages, and it was deemed advisable to keep the crew as free as possible from malarial poisoning, hence the breaking up of the great comfort of sleeping on deck while the vessel is under steam.

The ship left Para on the morning of February 19 at 6 a. m. and reached Barbados on February 23, 1898.

The trip through the tropics has added much to the anxiety of the officers on account of the weakened condition of the engineer's force, in which 33 cases of heat stroke occurred, and which will be made a subject of treatment in my quarterly report for the first quarter, 1898.

The insanitary condition of the ports referred to above added very materially to the care of the men of the command and entailed an unusual expenditure of stimulants and stores in the effort to keep them physically qualified for the performance of duty during her stay in such unhealthy surroundings as were found to exist.

REPORT ON THE INTERNATIONAL CONFERENCE ON LEPROSY.

By JAMES D. GATEWOOD, *Surgeon, United States Navy.*

The International Conference on Leprosy (Berlin, October 11-16, 1897) will occupy a prominent place in medical history. In the history of leprosy it should probably at this time be regarded as an event second only in importance to the remarkable discovery of Armauer Hansen, supplemented by the work of Albert Neisser and others. Indeed, it is doubtful if the gathering at Berlin would have been considered as practicable without the knowledge acquired during the last twenty-five years by the many workers in the field made accessible by the discovery of the bacillus lepræ as the cause of the disease. Throughout the whole discussion this seemed apparent, as the strong current of opinion and argument moved around that idea as a center.

It was explicitly stated that the assemblage was designated a conference in contradistinction to a congress as it was convened simply for the purpose of counsel or discussion in relation to one special subject, and not as a formal meeting for the purpose of determining and pressing a dictum for the guidance of nations.

The management was strikingly successful, and the German Government, with its well-known spirit of liberality toward all scientific effort, lent its aid and encouragement to the fullest extent. The Emperor not only gave an audience to the members of the conference, but his representatives addressed the delegates in words of welcome in the fine hall of the imperial sanitary office, which had been set apart for the use of the conference.

The arrangements made by Professor Lassar (Berlin), president of the committee on organization, and by Dr. Ehlers (Copenhagen), secretary-general, were singularly well adapted to promote the objects of the conference. In this connection it should be noted that very few papers were read in the sessions, but practically the entire time was devoted to discussion—the great purpose of a conference. This result was attained by the happy but laborious expedient of publishing the articles of the delegates in a carefully arranged volume, which was distributed to the members on the first day of the conference.

Naturally the suggestion presents itself that probably the discussions would have been somewhat more pointed if the printed papers could have been placed in the hands of each delegate some weeks earlier. But, nevertheless, the innovation was of great advantage, and contributed more than any other one thing to the success of the conference.

Those taking part in the discussions were generally men of international reputation, and entitled to every attention by reason of their original work and close study of the disease.

There was no division of the conference into sections, but all the members were in the same hall, and could thus follow the ideas of each speaker as the subject was gradually unfolded in accordance with the carefully arranged programme.

There was so little lost time and the entire work was completed to such advantage that there were not a few who felt that the large international medical congresses are too cumbersome and incongruous, and should give way to smaller bodies made up of men known on account of their original work and brought together to consider one set of questions.

The inciting cause of the conference was found in the German Empire, where, in Memel, a commercial manufacturing seaport of East Prussia, a marked development of leprosy had been discovered. The Government, recognizing an evil that had clung so persistently and with such varying degrees of intensity to all races, considered the time ripe for the systematic consideration of the disease, and took the initiative in requesting the leprologists of all countries and representatives of each nation to assemble in Berlin for that purpose. This laudable action brought the scientific mind of our time face to face with perhaps the oldest foe of man. It intensified the necessity for the recognition of the requirements of the age, while it collected much of the knowledge of the subject and created a new departure for persistent work in many suggested fields.

The programme under which the conference systematized its work may be stated as follows: (1) Introductory addresses. (2) How far are we warranted in regarding the bacillus of Hansen as the cause of the disease? (3) By what channel or channels is the body infected? (4) The pathological anatomy and histology of leprosy. (5) The rôle of heredity. (6) Emigration and immigration in their relations to the spread of the disease. (7) Nomenclature. (8) The position of leprosy among the infectious diseases; its relation to syringomyelia, Morvan's disease, and ainhum. (9) Therapy, especially sero-therapy. (10) Isolation of leprous patients and the measures requisite therefor; leper hospitals.

Some time was also devoted to the discussion of various propositions and of the report made by the secretaries on the general conclusions of the conference.

While it is not practicable to give in detail a discussion that occupied many hours of the week, it may be of interest to show to some extent the various opinions and arguments advanced.

The introductory addresses were well conceived, and opened the approach to the subject in a masterly way. The first was made by Dr. Ehlers (Copenhagen), who spoke of leprosy, syphilis, and tuberculosis as three sisters, and attributed the practical disappearance of the first from the States of central Europe, after the terrifying spread during the Middle Ages, to the severe measures then adopted of isolating the poor and even burying alive the living who were unfortunate enough to acquire the disease. On account of its resulting rarity in the more progressive countries its study had lagged far behind that of the other chronic infections. Unfortunately, the first scientific studies of leprosy (Boeck and Danielssen) had denied its contagiousness, which in the Middle Ages had been accepted absolutely. It was the contagiousness of leprosy which was the cause of interest, as to that was due the great modern epidemics which had astonished the public, not only in the homes of Europe, where its disappearance had been regarded as complete, but also in other parts of the world where the European encounters this malady and reimplants it on his return to his native country.

He recalled the words of the celebrated Hensler, "Cette maladie nous n'avons peut-être pas à la craindre, mais nos ancêstres ont subi ses ravages et nos enfants auront peut-être à la craindre a leur tour," and he asked whether it would not be better to isolate sporadic cases of the disease than to await its extension like that of tuberculosis, and have to do with a great epidemic.

He spoke also of the scientific aims of the conference, and protested against the apathy shown toward this ancient disease. He declared that many physicians were unacquainted with its symptoms, and when confronted with it made reports claiming the discovery of new diseases. During the last twenty years so-called new maladies had appeared which were only unrecognized leprosy.

He desired to restore to leprosy that which belonged to it by bacillary right, and expected its study, too long neglected, to throw new light on the pathology of other infections. For, he claimed, there is a striking analogy between those most common chronic infections which form a natural family comparable to chlorine, bromine, and iodine in chemistry.

He proceeded then to show that the pathological qualities of one find themselves with modifications in the others. Leprosy and tuberculosis are due to bacilli; we have the right to believe that syphilis has a similar cause. We know the initial cutaneous manifestations of syphilis and tuberculosis, and if we seek for it in leprosy we shall certainly find it; it ought to exist. We know that leprosy and tuberculosis are contagious in all stages; syphilis ought to be, though the contrary is claimed. We know that leprosy and syphilis have eruptions which are manifestations of the general intoxication; some analogous eruptions ought to exist in tuberculosis. We know Pott's disease is due to tuberculosis and syphilis; let us seek a corresponding condition in leprosy. Syphilis induces a disease called tabes dorsalis, and leprosy gives birth to an absolutely analogous disease (anæsthetic leprosy); a like state is still unknown to us in tuberculosis. While we know well the syphilitic diseases of the brain, we know little of the mental maladies depending upon tuberculosis and leprosy.

He also expressed the belief that the study of the chronic infectious diseases would transform to a remarkable degree our conceptions of peripheral nerve disorders, and that the study of leprosy would throw much light on the question of trophic troubles and those of sensibility.

He then placed before the conference the questions of its programme, and declared that while they would not all be answered in the same degree, they would be carried to an advanced line and the road of progress would be marked out.

Prof. Ernest Besnier (Paris) spoke with enthusiasm of the remarkable discovery of Hansen and of the work of Neisser in determining the method of staining the bacillus and in affirming its specificity, since which time not twenty years had passed. He recalled with pleasure the year 1880 when he himself took in hand the defense of the contagiousness of leprosy at a time when its noncontagiousness was taught as a dogma. He stated that in the year preceding Hansen's publication a French missionary, who had lived for many years with lepers, published in Paris a book entitled "La lepre est-elle contagieuse?" which concluded by saying, "Pour que ce mal s'implante, il faut un germe." To-day the germ is known and determined, but the question of its pathogenic value comes in contact with the difficulty that no lower animal furnishes a soil for its cultivation. It was therefore to the clinical study that the proof was relegated, and this required new, authentic, and precise statistics and entirely new chemical study of the leprous toxin, and researches along certain lines, which it was the purpose of the conference to show.

He then proceeded to outline the work of each of his French colleagues, which would be submitted to the conference. He spoke of Dr. Darier, who, in his examination of the erythematous and pigmentary stains of leprosy, had been able to find the specific bacillus in eight out of nine cases, sometimes in very great numbers. In cases where the clinical diagnosis was uncertain he had found the histological diagnosis practicable in the great majority, and this almost invariably confirmed by the presence of the bacilli. This result, he thought, ought to conduce to an appreciation of the significance of the macules of leprosy in the leprous processes, and to the determination whether they are due to the direct action of the bacilli, to intermediary nerve lesions, or to a toxæmia. It was for pathological biochemistry to determine why these macules disappeared so often, and why they did not transform themselves regularly into true lepromes.

He spoke of the work of Dr. Jeanselme (Paris) in connection with leprous rhinitis, and its great interest in relation to diagnosis and prophylaxis. In the muco-pus of leprous rhinitis and in the blood of leprous epistaxis are frequently found in profusion the bacilli of Hansen. As nasal signs are so commonly the first indications of the disease, he thought a systematic examination of the discharges would in all leprous countries lead to a much earlier diagnosis and place the true debut of the malady much nearer to the period of infection. From these researches he thought one could affirm that the rhinitis of leprosy is one of the most prominent agents in the dissemination of the disease.

In regard to the spinal sclerosis of leprosy, he considered that the examinations made by Jeanselme demonstrated that the direct action of the bacillus of Hansen could not be invoked as the cause, but that the lesions depended upon an intoxication. In the presence of the leprotoxin the cord appeared to suffer as it does in the presence of some poisons resulting from faults in digestion, as, for instance, in pellagra.

In comparing the anæsthesia of leprosy with that of syringomyelia, he stated that Jeanselme had shown that the two diseases are distinct.

While paying a high tribute to the remarkable work of Zambaco-Pasha, he took occasion to deny with emphasis the convictions of the latter that leprosy is not contagious and that heredity is all important.

It was in 1887 that he had informed the French Academy of Medicine of the great relative increase of lepers in Paris, resulting from the facility of maritime transportation. Numbers were attracted to St. Louis, where they were always received. Up to the present time, without isolation, there had not been a single known transmission of the disease. This he considered due to the active treatment, including baths, occlusive dressings, etc. From this one should not, therefore, conclude that leprosy is not contagious. On the contrary, he believed that the same lepers in a wretched fishing village, where cholera, for example, makes an immediate extension, would create after the necessary time a focus of infection. It is this consideration that makes measures of prophylaxis so important to all nonleprous countries. It is one of the questions that the conference ought to answer with the greatest precision.

He said that MM. Gémy and Raynaud, of Algiers, would report the formation of a focus of leprosy in that city and in Algeria. In ten years they have recorded twenty cases, due to Spanish immigration.

Among the indigenous lepers it does not appear that there are more Jews than Mussulmans. The new foci in the ports of Algeria have not manifested expansion. They are simply in the process of formation, and if necessary measures are not taken their increase, with eventual consequences, is certain. The measures to be proposed are the only means of preventing the appearance in the twentieth century of the history of the leprous foci in the ports of Algeria.

Dr. Armauer Hansen (Bergen), a vice-president of the conference, made an address, which, on account of the prominence of the speaker and his extensive experience, commanded the closest attention. He spoke in part as follows:

It is often asserted that those who desire to isolate the poor, sick with leprosy, are cruel and inhuman. At least this was said in Norway when in 1885 the law was passed giving boards of health authority to compel isolation in special institutions when patients were unable or unwilling to obey the order of isolation in their own homes. It was asserted that we deprived the unfortunate ones of the sympathy and protection of their people and added to their misfortune by depriving them of human society. I am afraid mankind would be indeed desolate if we trusted to fortune alone to regulate the number of cases of the disease. No one hesitates to interfere in typhus or cholera, and why should we not take measures against a chronic devastating disease? The objection stated is undoubtedly very human, but in my opinion results from misdirected impulses. No one will uphold the idea that it is a human right to infect one's neighbor. Why, then, should a leper have that prerogative?

A sick man has with his rights also his duties, and the greatest and most sacred duty is not to endanger his fellow-men. Furthermore, the well also have their rights, and one of them is to protect themselves from disease. Fortunately the well are in the majority, and undoubtedly it would be senseless to transform that majority into a minority. Evidently mankind in a healthy state is more valuable, and the misfortunes are only increased when a number are allowed to become sick.

I find it more humane to protect the people from leprosy than to give lepers the right and chance to make others leprous. I do not doubt we would do mankind a great service if we contrived to free it from leprosy, though this without doubt seems impossible.

It is probable that a few lepers suffer additionally from forced isolation, but, if we arrange our leper asylums properly, the increased suffering will be so trifling that it can not be counted in comparison with the great result desired. The worst is the parting with one's family, but a sensible and right-thinking man with consideration for his family will rather leave than expose them to a constant danger by remaining.

We should endeavor to oppose leprosy also from an economic point of view. Every sick man is a bad workman and therefore a loss to society. It is therefore very profitable to prevent the disease. No money bears such good interest as that expended for sanitary purposes. I can state that in Norway, from 1866–1890, about 6,000,000 crowns have been expended in opposition to leprosy and that in the protection afforded the well 15,000,000 crowns have been saved.

The question would have a different appearance if we had made more progress in the therapeutics of the disease, but unfortunately we can not take to ourselves much credit in that direction. Several have asserted their power to cure the disease, among them my countryman Danielssen, who devoted his whole life to that object. Yet in my opinion, after fifty years of labor, he had not cured a single case. I must say here that the nature of the disease is, I believe, toward a cure—that all lepers, if they lived long enough, would find a cure. That is the course of all bacillary diseases, acute or chronic. If one should treat as many cases of leprosy as Danielssen did, there will be naturally among the number some whose cure will be attained during the treatment. I have seen several of those he discharged as cured and a few have remained so, but on most of them there have been further developments of the disease, though with convalescence assured; in some I have noticed a relapse.

He selected his cases for treatment and very soon discovered that tuberous cases almost never heal, while the maculo-anæsthetic may. Does there not appear a time when the skin eruptions have disappeared and the anæsthesia has not well developed? At that time patients appear almost normal, are so occasionally, and remain so, though rarely. Dr. Danielssen recognized this, but he asserted that the treatment materially assisted the change and helped to preserve it. He tried every other treatment recommended, and while doing so naturally acted as any other experimenter would. They all failed in his hands.

In our opposition to leprosy, antibacterial and antitoxical remedies are tried. Our colleague, Dr. Unna, from Hamburg, tried that plan several years ago, and asserted that he had cured leprosy. Dr. Danielssen employed his method, but it did not cure Norwegian leprosy. The latest in this direction is the serum treatment of Dr. Carrasquilla. He produces the serum by injecting the blood of lepers into animals already immune. Before trying this treatment I am unable to judge with certainty, but I believe that the blood serum of immune animals would act as well as that of the treated animals. As we do not know any immunity in lepers, who until their death have constant eruptions and consequently are not immune, it does not look reasonable that their blood can contain an immunizing substance.

All therapeutic experiments on lepers have proved so far complete failures, or at least too uncertain in the fight against the disease. We would therefore be more sensible and humane if we prevented the spread of the disease by isolation and employed that measure in our attempt to exterminate it. Should that result never appear, we would at least have made mankind happier and healthier.

As Dr. Jonathan Hutchinson (London) was prevented through indisposition from being present, his address was read in the conference.

His position, as declared in that address, was the one he has so long occupied. "I ask to be allowed to again reiterate my conviction, a conviction which strengthens every year, that the cause of leprosy is the use of fish, in certain conditions, as food." He then proceeded to advance, with his well-known ability, the arguments for his creed. Those arguments are so well known that it would be useless to repeat them here. It was apparent, however, that in spite of their high source they had very little weight in the estimation of the conference. He considered it impossible to regard leprosy as a climatic disease, or in any way connected with poverty or neglect of external hygiene. He stated that though many Norwegian lepers had been introduced into the United States, there had never been a single instance of contagion recorded, and that the general verdict of recent authorities who have investigated the facts in the great leprosy centers had been adverse to a belief in contagion. If leprosy were contagious it would, in his opinion, never leave a country, and would spread inland without regard to local peculiarities. It would in fact assume a universal prevalence. The belief that leprosy is hereditary had been much discredited. It was neither contagious nor hereditary. He claimed that precisely in proportion to the difficulty of procuring salted fish is as a rule the acknowledged infrequency of leprosy.

"The question will naturally be asked, how does the fish hypothesis, or any food hypothesis, square with the demonstrated presence of a bacillus? We know, I think, enough as to the laws of life in vegetable parasites to recognize the probability that these organisms may require special forms of food. There is nothing in the least improbable in the supposition that peculiar stimulants may be required to rouse them into vital activity. In late years our creed as to the probable latency of germs (and in particular of the tubercle bacillus) has been largely extended. It is now, I believe, admitted by many that this parasite may remain in the tissues in a state of absolute latency for many years, and even for a life, ready under favoring circumstances to manifest its activity. The bacillus of leprosy is probably closely allied to that of tubercle. That it may remain latent for many years has been fully proved.

"An instructive parallel might, I think, be drawn between leprosy and certain forms of lupus.

"It is even within the range of possibility that the bacillus of leprosy may be after all a modified form of that of tubercle. The modifying influence may be some chemical stimulant taken into the system as food. This is one hypothesis. A second and possibly the more probable one is that the bacillus itself is received with the food. In different cases both of these methods may probably come into play in the production of leprosy. At any rate, I contend, it is easy to show that the existence of the bacillus by no means excludes the hypothesis that the malady is one due to food and not either to external contagion or to telluric influences. It remains but to add that, if the food hypothesis be the true one, all measures for the compulsory segregation of lepers are useless and cruel. The disuse of all forms of half-cured or uncooked fish is, I feel convinced, the simple measure which ought to be enforced in districts in which leprosy is prevalent."

Prof. Albert Neisser (Breslau) spoke of international medical congresses and the advancement of medical knowledge resulting from them. He was, however, of the opinion that this conference was strengthened by the confinement to one subject, and he regarded the presence of delegates sent by the different Governments as a manifestation of international interest and of hopeful signification of the desire for international action. The disease existed on every continent, and in not a few places was in a stage of threatening increase. It was the duty of medical science to show the cause of the disease, to discover a means of cure, and to prevent the spread. The various Governments needed some definite policy, but should have a good foundation given them for any measure directed against the disease. But what has medicine done in relation to leprosy? Therapeutically, very little; but nevertheless much, because it has discovered its cause and shown the way to prevent its spread. But this method can not be carried out by the physician unaided. He must depend upon authority derived from the Government. We now see the hope that what clinical and laboratory work have shown to be necessary will find practical expression in legislation affecting every country of the globe.

He also expressed the hope that the conference would be followed by others dealing with other chronic infections which were damaging health, life, and national prosperity.

He believed that we had the right to assert that leprosy is a contagious disease. We know that it is caused by a micro-organism, the discovery and knowledge of which was due to Armauer Hansen, whose name was thus associated forever with the science of leprosy, and to himself. Hansen wrote about the rods, which he called the bacillus of leprosy, in 1873. Through his own publications in 1879 and the labors of many investigators, we now know that there is not a well-recognized case of the disease anywhere in which the bacilli can not be found, and do not by their multitude and locality thoroughly account for all symptoms. It is the only constant sign in all lepers, and is entirely independent of race, sex, method of living, residence, and climate. The bacillus is characteristic of leprosy, and can be distinguished from all other bacilli found in other diseases of man or beast. These two facts are sufficient to warrant the decision that the disease is caused by the bacillus, in spite of the inability to produce the disease outside of man. Unfortunately, we can not cultivate the bacillus, nor do we know any lower animal susceptible to the disease.

But how is infection effected? Observation shows, in the absence of experimental knowledge, that the disease is propagated by infection and, so far as we know anything positive at all, only by direct transference from man to man; nowhere and never has anyone become leprous who has not been in contact with lepers. Though sometimes clouded by the mist of circumstances, every case can be traced to lepers. Everything points to the one assertion that mankind itself is the only source of new cases. Leprosy belongs to the class of contagious diseases, and the bacillus does not appear to possess vitality outside of the body.

But the established fact that the disease is contagious does not include any expression of the virulence of the contagium. With leprosy it is fortunately the fact that coming in contact with a leper does not necessarily produce infection in a given case. Then, too, the different forms of the disease are not dangerous in the same degree. We can also apparently count upon the fact that the intact skin and mucous membrane does not admit the bacillus, which is, however, thrown considerable distances by the acts of speaking, coughing, and sneezing. Another factor of importance is that probably all bacteria leaving the body can not be considered alive and virulent. The danger of lepers in relation to the origin of infection must be considered in connection with the fact that the substance of infection does not easily find its way into man, and that in spite of danger from familiar cohabitation the participants do not always suffer. This fact is the main argument of the opponents of the opinion of contagion. But we can not always use a negation as a positive argument. It is probable that there are conditions of the well as in the sick that favor infection. In leprosy, as in other infectious diseases, there is a great difference in susceptibility whether we consider it as a predisposition to infection or as an immunity.

We also do not know anything of the channels through which the bacillus enters the body. It seems more probable that the admission is effected through the respiratory passages and that the infection of the skin and nerves is secondary. It is also conceivable that infection comes from the alimentary canal. But in any given case the probability of the channel of infection should be considered in connection with the peculiarity of life and the form of disease.

The speaker then proceeded to state that there is no reason to believe that leprosy is hereditary. What is considered to be hereditary transmission is simply infection favored by familiar cohabitation of members of a family. Thus is easily explained why children and parents acquire the disease. The greater the poverty and wretchedness, the more the crowding in small, narrow rooms, the greater the ignorance and carelessness, the more the contagion prevails. Anything, too, that goes to impair the resistance of the constitution to disease tends to infection.

In the opinion of the speaker only one essential thing devolved upon the conference—to declare candidly and absolutely that, for scientific reasons given, leprosy belongs to the group of contagious diseases and is only spread by contagion. If that should be done much would have been accomplished, as a way would then be found suitable to the disease to prevent its extension. It would ultimately lead to the expression of the opinion in sanitary decrees, and, what may be of more importance, to the construction of well-considered institutions. It would lead hesitating Governments to regard leprosy in that light. Such an opinion is necessary for the carrying out of proper prophylactic measures, leading more or less to the separation of the sick from the well, which would follow a popular understanding of the disease, and be in accord with the habits, customs, and social conditions of each people.

By this opinion the conference would erect a monument in the history of leprosy, and, he hoped, in the history of the extinction of leprosy on the globe.

Dr. Isidor Neuman (Vienna) called attention to a new focus of leprosy in Bosnia and Herzegovina, discovered by him in 1890. Up to that date no one in medical circles had any idea of the existence of leprosy in that province. On his first visit he was able to record 8 cases. After the physicians had made themselves acquainted with the disease the Government ordered a census by the board of health. In 1893 he traveled over the country the second time, and again in 1897, seeing all cases and confirming diagnoses. Hospitals have been established and provided with everything necessary to study the disease. So far 133 cases have been reported, which is probably not much below the actual number, though the female Mohammedans are not accessible for examination. Among the females generally there is, however, a relatively much smaller number of cases—116 males and 17 females. In the whole population there is 1 leper in every 11,789. Norway, with a population of 2,000,000, counts 800 lepers, and Iceland, with 80,000, counts 200. In Bosnia and Herzegovina there are 61 cases out of a Mohammedan population of 548,632, 50 cases in the Oriental Orthodox Church of 673,246, and 22 among the Catholics numbering 334,142. There is, therefore, a larger number among the Mohammedans than Christians. On the other hand, no case of leprosy could be found among the 8,000 Israelites, which is noteworthy especially as they are mostly descendants of Spanish immigrants of the sixteenth century. This is in remarkable contrast with the assertion of Zambaco, who claims to have found leprosy in Constantinople exclusively among that class. It is also of interest because it shows that the part of the population that entered the country last have remained free from the disease by breeding in and exclusiveness generally. The same factors in one class favored the spread of the disease, which, in the other, being free from the disease, prevented its introduction.

He then proceeded to show how leprosy had been spread over Europe by military operations, beginning with its introduction into Italy during the Roman Empire. He assumed that it had never died out in Bosnia. Among the 133 lepers there was none below 6 years of age. This is noteworthy as bearing upon the question of heredity, even considering the period of incubation. It also bears upon the degree in which the disease is infectious, as in Bosnia all members of a family frequently live in one room, huddled together. The largest numbers of cases occurred between the ages of 16 and 30—the time between puberty and maturity.

In the Middle Ages the leper was cast out from society. The same is done to-day in Bosnia, though with modifications, as he is surrounded with a care which aids him to carry his physical and mental burden. In the past he was surrendered to public contempt; to-day he is sought out in the most distant and remote places and carried to better surroundings. Most of the cases (117) are farmers, their children and servants, 6 are farm laborers, and 5 are shepherds. Most of them are poor and miserably clothed and housed, the houses being of clay, some of them without a chimney, and filthy. The food is wretched. Fish, however, are very rarely eaten and only by the population near the rivers. These circumstances are a speaking proof of the limited power of lepers to infect.

The mortality is great, especially in the tuberous form. Since 1890 32 of them have died in their best age. Among the 133 cases, 28 were of the anæsthetic form. The largest number of cases are near the border of Servia and Montenegro, off from even the least frequented high roads, while no cases have been found on the Austrian frontier.

Dr. Oscar von Petersen (St. Petersburg) spoke of the necessity at this time to agree upon measures to be taken against leprosy, but considered as a matter of course that the question of leprosy did not have the same importance for all countries. Russia, next to Norway, had, perhaps, the greatest interest in the disease, as several centers of leprosy had been formed there, from which also the disease could be carried, as seemed to have occurred already in relation to East Prussia.

Russia may be called the great filter of Europe, as it often happens that she has to stand the first impact of epidemic diseases from Asia. With this knowledge she endeavors diligently to maintain complete measures against the importation of epidemics.

Of course, it is somewhat different with leprosy, for when the disease was imported into Russia, and from where can not now be determined, only since the contagiousness of the disease has been decided have we paid much attention to it, especially as only within recent time has it made remarkable progress. The German board of health had sent a commission to Russia to study the arrangements of the leper asylums. Since the Russian board of health had arrived at the conviction that leprosy is contagious, a number of measures in opposition to the disease have already been adopted. All cases had to be reported and, after inspection, were regularly recorded. Asylums and colonies were considered the surest way of opposing the spread of the disease. The Government fully appreciated the efforts of a number of philanthropic societies in that direction. The Red Cross interested itself in the subject and had declared a willingness to contribute toward the establishment of leper colonies. We can well hope that the number of asylums already existing will in a short time be considerably increased. Some questions are still awaiting further elaboration, notably the best management of these institutions. Speaking of leprosy in relation to the 127,000,000 people in Russia, it can not be said that there is at present any threatening danger in a country so sparsely settled. Yet the question assumes a different aspect when we consider the different centers of infection now in existence. As, according to the prevailing opinion of the contagiousness of the disease, leprosy can spread wherever lepers arrive, it is necessary to act in time and battle against the disease. This is well understood in Russia, whose Government sends its representatives in the strong conviction that the conference will establish the character of the disease and outline a universal and timely effort against what is called in East Siberia "the lingering death."

These introductory addresses are reported more fully than the discussion proper, as they were all made by men among the most prominent at the conference and will serve to give to a certain extent the opinions apparently prevailing in different countries. The probable exception to this is found in the address made in English, as the reader of that address, himself a prominent English leprologist and writer (Abraham), took occasion to state his opposition to the opinion therein expressed. Considering the latter rather than the former as a representative of English opinion, it would follow that all the countries represented in these addresses considered leprosy a contagious disease. Norway, Denmark, Germany, Russia, and apparently Austria, would seem to favor the isolation of every case either in the home when practicable or in asylums or colonies. France, while believing that leprosy is contagious, considers that Central Europe offers great natural obstacles to its spread, and believes that such measures should be resorted to only in places where the disease shows power to form foci or has a great extension. England, while entertaining a similar opinion as to the nature of leprosy, apparently considers that there are other practical considerations which would make the attempt at absolute isolation quite futile, as "social and political conditions in different colonies and dependencies vary so very much."

Considering the conference as a whole, the same opinions may be said to have prevailed among the different nationalities represented. The idea of the contagiousness of leprosy undoubtedly triumphs at the present time. The bacillus of Hansen is considered to be the cause and isolation the only true safeguard. There is an opposition which does not lack strength, but it is apparently losing some of its most brilliant intellects. Besnier, of Paris, considered that heredity in leprosy is only probable or likely, while contagion is certain or positive. In an interesting letter written by W. C. Bailey, superintendent of the leper missions asylums in India, and read in the conference, the statement is made that after twenty-seven years of experience he is convinced that if children of leprous parents are separated from leprous surroundings they will in most cases never contract the disease. He knew of many children thus separated who had grown up, married, and had children, and the disease had never appeared either in them or their offspring. He also stated that the most leprous districts in India were those where no fish could be procured. He, however, added that he had never known a missionary or native assistant working among lepers to contract the disease, and believed that it could only be propagated by inoculation, necessitating the segregation of all cases having open sores.

In this connection it may be of interest to cite a case shown at the first session by Professor Weber, of Halle. In this case the lepra bacilli were not only found in sections of affected skin, in the integumentary epithelia, and, in small quantities, in the perspiration, but also in the seminal fluid. He had not found them in the nasal secretions or sputum. In a blister intentionally produced the serum contained the bacilli. Dr. Sticker (Giessen) was able to demonstrate to the conference the presence of the bacillus in the nasal secretion.

The presence of the bacillus of leprosy in the seminal fluid or in the ovaries, where it is also reported to have been found in large numbers, was considered by many as at least of doubtful value in relation to the direct question of heredity. Probably the statement made by Dr. Ehlers, relating to the question of propagation by inoculation, commanded somewhat more attention. He believes that the initial lesion of leprosy varies according to latitude and habits of life. In Iceland the first manifestations occur most often on the face and hands, appearing in the vicinity of the point of entrance, as in syphilis, while according to Dr. Geill, of Java, where the people are barefooted, the initial lesions have been seen on the feet in 50 per cent of his cases. He considered that in leprosy, as in syphilis, there is no single place that can be regarded as the gate of entrance, and he was convinced that the respiratory passages should be regarded among us as of primary importance.

Dr. Alvarez, of Honolulu, declared that the "Hawaiian lepers, as a rule, have no children; so that if the disease depended upon heredity for its propagation, it would have died out in Hawaii long ago." He had "never seen a child born with leprosy, and the youngest leper known in Hawaii was over 3½ years of age."

Instances were cited by different speakers in which it would appear that the propagation could only have been by contagion. There were, however, in the conference those who, while affirming that leprosy is generally spread by contagion, considered that the disease is, perhaps, in rare instances, transmitted by heredity, as in tuberculosis, the number of such cases being, however, in marked contrast with syphilis. And there were not lacking some who considered heredity the common factor or heredity and contagion of equal value. Cases were cited to substantiate these views.

In regard to the specificity of the bacillus of Hansen, the opinion of Professor Neisser is seen in his introductory address. Unless that was admitted he was unable to see how the bacillus could always be found in persons having leprosy and was never found in any other disease. That the bacillus is the cause of the disease was generally claimed in the conference. Darier (Paris) considered that probably the difference in the forms of the disease depended upon the difference of soil, and also upon the virulence of the bacilli. Professor Kaposi, of Vienna, while believing the bacillus is the cause of the disease, affirmed that leprosy may exist without the germ being found. His opinion was that there were cases which could only be diagnosed clinically. Dr. Hansen himself stated that he had seen cases of leprosy in which the bacillus could not, apparently, be demonstrated; while Petrini de Galatz (Bucharest) reported a case in which he had been unable to find the bacillus, but claimed that such cases were exceptional, and that the same situation existed in other diseases. The absence of the cholora spirillum had been noted in typical cases of the disease. Professor Von During (Constantinople) believed that the quality of the bacilli should be regarded rather than their quantity, as they could be present in such small number as even to be apparently absent, and yet produce the same lesion as in other cases in which they could be demonstrated in number. Dr. Von Petersen

(St. Petersburg) expressed the same view. Unna, of Hamburg, said that he had never seen a case of tubercular leprosy in which the bacilli could not be found. The failure to find them was due simply to the method employed, as the bacilli might very well have undergone such degenerative changes that they would not respond to ordinary methods.

While there was little heard in the conference against the specificity of the bacillus of Hansen, it seemed only fair to state that no less a person than Zambaco-Pasha was represented by a paper in which he denied, in his able way, its pathogenic rôle and claimed that leprosy is a noncontagious disease in which heredity occupies a very important place. It would seem, however, that his arguments were all very ably refuted, and that they had very little influence in shaping the opinion of the conference.

Considering, however, the number of the bacilli frequently found in the secretions of the nose, and the rapidity with which they are thus and in other ways thrown off from the body, in connection with the slowness with which the disease is propagated, it would seem highly probable that at least the large majority, when separated from the body, are either dead or inert. Such an opinion was expressed by Dr. Arning, of Hamburg, and also seemed to be the opinion of Hansen and Neisser, who did not apparently attach much importance to the dissemination of the bacilli by the nasal secretions. Others, however, believed that the nasal and buccal secretions are most important agents in the dissemination of the disease.

Hallopeau, of Paris, suggested the idea that the bites of insects might be a factor in the infection, as was the case in malarial fevers. He also, with several others, dwelt at some length on the fact that in none of the hospitals in Central Europe had any physician, attendant, or patient contracted the disease from unisolated lepers under treatment in the same building. He thought that the transmission in leprous countries might often be due to the washing of linen of families in common. Professor Lassar (Berlin) thought there might be an analogy in transmission between leprosy and lupus. Lupus began most frequently in the nose. Children creep on dirty floors and pick their noses with infected hands.

The time devoted to the discussion of the pathological anatomy and histology of leprosy was largely occupied on the question whether the lepra-bacillus is essentially intracellular or extracellular, Dr. Unna being the principal champion of the latter view and Professor Neisser of the former. The question seemed finally to depend upon one of technique, as it was claimed that by a new method of staining it could be shown that the bacilli were surrounded by a gelatinous material, representing old disintegrated bacilli, which had been mistaken for the cellular bodies. The subject may be one of some importance, on account of a possible bearing upon dissemination of disease within the body. Histologists present seemed to demonstrate without doubt the presence of the bacilli within cells.

Professor Babes (Bucharest) said that at the present time there is no biological proof that the bacillus of leprosy forms spores. In comparing the bacillus with that of tuberculosis he claimed three principal differences. The former colors more easily, yet retains its color longer and more energetically, and exists ordinarily in great compact masses. It appears not infrequently in organs which macroscopically and microscopically appear absolutely normal. It has the disposition to develop in the tissues in spherical colonies. He insisted that the existence of lesions on the skin and mucous passages by no means necessarily indicated the points of invasion, Nocard having shown that glanders produced by the introduction of cultures in the alimentary canal exhibits itself first in the mucous membrane of the nose. He had made 22 necropsies in leprosy and had always found the bacilli—in 9 cases within the cord. The bacilli were also demonstrated in testicles and ovaries.

Dr. Jeanselme (Paris) reported that in 5 autopsies he had examined the peripheral nerves, the nerve roots, and the cord. The cellular changes were slight, but the posterior columns of the cord were sclerosed in an irregular manner. While the columns of Burdach were always free from disease, the columns of Goll and the posterior internal root zones were degenerated. Besides other changes, the lateral columns were uniformly affected. The posterior roots were unaffected. The vessels were not thickened, and he had not discovered the bacillus in the sclerosed tissue. He considered that the alterations were produced by a toxin resulting from the bacillus.

Dr. Alvarez, of Honolulu, described a method for the bacteriological diagnosis of leprosy which he considered was not only reliable in obscure cases but could be performed by a physician without laboratory facilities. The tissue to be examined having been removed, it is washed in normal salt solution and thoroughly triturated in a mortar until a homogeneous result is obtained, under the addition from time to time of enough saline solution to keep the specimen from drying. Then a small quantity is transferred to a cover glass, dried and fixed in the usual way, stained in carbol-fuchsin (warming for two or three minutes), washed and decolorized and counter-stained with Gabbett's solution for thirty seconds. If there are very few bacilli in the specimen it will be necessary to add more saline solution and use the centrifugal machine, or allow settling in a conical glass for at least twenty-four hours. Specimens kept in alcohol should be first immersed in water. It is very important to make a positive diagnosis of leprosy where the question is the banishment of the patient for life, and by this method he claimed that a diagnosis could be made in a few minutes.

Dr. Abraham, of London, demonstrated by lantern slides, prepared by his colleague, Dr. Herman, that the age of the lepra-bacillus has an important bearing upon its staining properties. The preparations were all made from the exudation of compressed cutaneous nodules. The old bacilli resisted the action of the nitric acid solution when decolorizing after carbol-fuchsin, while new bacilli did not, and were restained by the counter stain, methylene blue (Weigert).

The position of leprosy among the infectious diseases, its relation to syringomyelia, Morvan's disease, and ainhum, was not discussed at great length by the conference. The speaker who occupied most of the time was Professor Kalindero, of Bucharest. He began by expressing his admiration for the conscientious work of Zambaco Pasha, and stating his belief with him in the heredity of leprosy, which was necessitated by a long series of observations. This opinion was also impressed upon him by bacteriological study. In different necropsies he had found:

(1) The bacilli in the organs generally;

(2) In the general circulation more rarely, but more often in the organs and in the capillary blood of those organs;

(3) In the salivary glands, the pancreas, the mammary glands, the testicles, the ovaries, the canaliculi of Flugge, even in the kidneys.

(4) The testicles, in appearance sound, nevertheless contained the bacilli, sometimes free, sometimes forming masses in the interior of

the semeniferous tubes. The ovarian juice contained enormous masses of the bacilli.

He then referred to Zambaco's recent work, "Les lépreux ambulants de Constantinople. Paris, Masson, 1897, page 315 et suivante," where, while admitting that leprosy is a disease of adult life, he cites cases in children of 9 or 10 years. Danielssen had observed a case at 1 year, and Dr. Zambaco has seen the disease in children 1 and 2 years of age, and even in those who had had only a few weeks or months of existence, one or both parents being advanced in leprosy at the time of conception. He then cited an instance in which the mother, without leprous antecedents, had contracted the disease which developed afterwards in her children when they were 3 and 5 years of age, respectively. He admitted contagion, but believed also in heredity. He had known two children without a family history of leprosy who had contracted the disease from nurses, and a mother who had been infected by a child. In the mother he had found numbers of the bacilli in the general circulation, but none in the milk. There were, however, bacilli around the nipples and in the tubercles on the cheek of the child. He believed, from experiments made by Professor Babes, that the leprous microbe had gained entrance by way of the hair follicles, through the unbroken skin. From his own observations he was convinced that the bacillus should be considered a constant pathognomonic sign of the disease, and essential in the determination of anæsthetic leprosy from other diseases of the nervous system. In all cases which were likely to be confounded during life with syringomyelia or other nerve maladies, it could be found at the autopsy. He was convinced that many cases of obscure, atypical forms of anæsthetic leprosy had been considered as syringomyelia. He had known cases of leprosy in which it had been impossible to make the diagnosis by bacteriological examination, either of the skin or of the serum obtained by vesication. He then proceeded to give in detail the signs and symptoms that favored the diagnosis of syringomyelia and those favoring leprosy, contrasting the two affections and regarding them as distinct diseases. He admitted, however, that there were occasional cases in which the bacteriological examination after death was necessary for an absolute diagnosis. A case was cited which during life gave the symptoms of syringomyelia, but in which the bacillus of Hansen had been found after death. While thus admitting that there were occasional cases in which the differential diagnosis offered insurmountable difficulties, and that there were forms of leprosy which were often unrecognized, he was unable to agree with Dr. Zambaco, who not only considered syringomyelia, Morvan's disease, and ainhum as simply forms of leprosy, but included several diseases under the same head.

He believed:

(1) There exist several morbid states of the nervous system having the general appearance of syringomyelia.

(2) Leprosy can appear in that category.

(3) Syringomyelia is a distinct disease, having its own symptoms and morbid anatomy, with which the bacillus of Hansen is not associated, not being found in the cavities of the cord.

(4) One may encounter some forms of anæsthetic leprosy with alterations in the spinal cord simulating even syringomyelia, but they are characterized by the presence of the bacillus.

(5) Radiograph researches show the alterations of the phalanges peculiar to leprosy, and enable one to differentiate that disease from

syringomyelia and Morvan's disease. This, with the clinical characters, differentiates the three diseases.

(6) The bacillus of Hansen is the essential characteristic in separating leprosy from the other diseases having the form of syringomyelia.

(7) Scleroderma should not be considered as having an identity with leprosy.

(8) Ainhum, which should be considered a congenital affection, will depend upon leprosy if the bacillus is found. Then the idea of congenital leprosy would be definitely established. It would be only incontestable congenital leprosy.

In following the discussion one could not but arrive at the conclusion that there is truth in Zambaco's contention in regard to unrecognized leprosy, and that much of it is classed as syringomyelia. This was exemplified in a so-called case of that disease brought before the conference and considered as such at a clinic in Berlin. Dr. Von Düring introduced the case as one of leprosy, and it was so considered.

The contention of Zambaco, as set forth in his paper submitted to the conference, is that Morvan's disease is nothing else than lepra mutilans. This identity he claimed to have established, and that it had been accepted by many leprologists. He also quotes Dr. Falcao, of Lisbon, as having stated that he had seen cases diagnosticated as syringomyelia by Charcot that were undoubtedly only leprosy. We have classed, he said, under the title of syringomyelia, numbers of lepers having the anæsthetic form of Danielssen. Progressive paralysis (Aran-Duchenne) also included divers diseases, among which appears leprosy. Reynaud's disease (symmetrical gangrene), a disease depending upon circulatory and trophic nerve troubles, presents marked connections with certain forms of leprosy. That which is certain at this time is that we have placed here also many cases that should be regarded as leprosy. It is probable that future researches will demonstrate that these new diseases are only leprosy modified and enfeebled in its modifications.

The absence of the microbe should not, in his opinion, authorize us to exclude leprosy, which ought to be diagnosticated, above all, clinically. The bacillus of Hansen was not sufficient for the diagnosis of leprosy, since the most careful search, he was satisfied, did not succeed in finding it in the immense majority of lepers, except in the tuberous form. Ainhum he regards as simply a modified or restricted form of lepra mutilans, and under leprosy he also classes scleroderma and morphea.

His paper was a very long one, and he made interesting arguments in favor of every contention. His experience is wide, and he has proven to all Europe in a startling way his remarkable ability to detect leprosy by showing its existence in localities where it was regarded as extinct. Yet the majority of leprologists are undoubtedly opposed to his most prominent contentions, and found their conclusions upon histological and bacteriological work carefully and ably conducted. While syringomyelia is regarded as a distinct affection, Morvan's disease is by many considered as an expression sometimes of leprosy and at others of syringomyelia, though Kalindero seemed to regard all three as distinct morbid conditions.

Much of one day's discussion was devoted to therapy, especially serotherapy, in which, of course, the serum of Carrasquilla occupied the most prominent place.

The discussion was opened by Dr. Laverde, of Socorro, Colombia, who first placed before the conference his ideas of the general treatment of leprosy. It was necessary, he said, to examine every case carefully, ascertaining the condition of the digestive passages, heart, lungs, viscera, nervous system, urine, and finally the lesions of the skin. Each particular indication should be met by appropriate medication before specific treatment was commenced. In general he recommended to his patients a diet composed of 2 liters of milk daily and green vegetables, onions, and white meats. He destroyed all lepromes and leprous tubercles with the thermocautery and carefully disinfected all ulcerations with solutions of permanganate of potash, using finally a sterilized water dressing.

The specific treatment consisted exclusively of sero-therapy, a treatment which had been discussed and approved by the Medical Society of Bucaramanga, composed entirely of leprologists familar with all varieties of the disease and employed daily in its treatment. The effects had been fully investigated in 60 cases, in which there had always been an evident amelioration, varying in degree, but always sufficiently evident to convince every member of the society that it was not due to the natural course of the disease. The improvement was observed in all directions, infiltrations absorbed, stains attenuated, tubercles greatly diminished, ulcers cicatrized, anæsthesia diminished rapidly, tactile sensibility reappeared, etc. Those who suffered from the violent neuralgias seen in leprosy were relieved of their pain, and the paresis due to peripheral neuritis was much diminished or entirely abolished. The bacillus of Hansen, found in the skin in numbers before treatment, became rare and entirely disappeared with the infiltrations and lepromes. Six cases had apparently recovered. The future alone could declare whether there would be a reappearance of the disease. The method was still in its infancy, and, until the cultivation of the bacillus was achieved, would necessarily lack exactness.

The picture presented by Dr. Laverde seems undoubtedly one of reality and full of promise. Dr. Carrasquilla himself made similar claims for the serum treatment, emphasizing and reiterating his former contentions. But unfortunately the mass of evidence presented to the conference was diametrically opposed to the claims made.

Dr. Hallopeau, of Paris, said that he had treated six cases of leprosy at St. Louis with the serum of Carrasquilla. In three the results were absolutely negative, while two had some intense extensions during the duration of the treatment. Dr. Alvarez, of Honolulu, had treated 14 cases in the same way with no improvement in 12. In one case of *lepra anæsthetica* there had been a marked improvement at first, which disappeared under continued treatment. Another patient, however, showed marked improvement. He had observed new eruptions during the course of treatment, in spite of Dr. Carrasquilla's statement that after the first injection no new manifestations appear.

Dr. Abraham, of London, reported one case in that city and one or two from Robbins Island without good result. Dr. Ehlers did not speak from experience apparently, but seemed to consider that serum-therapy rested upon too frail a foundation to generate even a hope of success. He intimated that the serum of a horse without the addition of leprous serum would accomplish as much. This, however, was denied by Carrasquilla on experimental evidence.

The general opinion was, undoubtedly, that the serum had failed as a curative agent and was without any effect whatever in the large majority of cases. Reported improvements in a few instances might warrant a more extended trial, but that these were more likely due to other treatment instituted at the same time or to the natural course of the disease in the particular case.

Professor Besnier, of Paris, advocated chaulmoogra oil and the use of the galvano-cautery. He presented photographs of a case of tubercular leprosy treated in that way from 1888 to 1893 and apparently resulting in cure.

Dr. Alvarez considered thyroid extract, in doses of 2½ grains thrice daily, an efficient remedy against the œdema of leprosy.

Dr. Unna praised the use of ichthyol, alexin, and strychnin, employment of friction with green soap, and cauterization with concentrated carbolic acid and caustic potash. Professor Neisser recommended iodoform and europhen.

It was apparent, during the discussion, that the combined effort of years found the treatment of leprosy confined to mere amelioration by tonics, residence in a temperate climate free from the disease, diet, and, in some of its forms, treatment of the skin by cauterization and with disinfectants. But little was said of the use of mercury and iodide of potassium. Dr. Ehlers, however, said that mercury had been employed in Copenhagen in the treatment of lepers from Iceland and that the immediate results had been good, though without effect on relapses. He added that the treatment had not been continuous, as in syphilis, on account of the long distances from physicians in Iceland.

With the treatment of leprosy on such a different basis from that of syphilis it was natural for the conference to consider that the only availing weapon against the disease was prophylaxis. With the idea of contagion prevailing, this narrowed itself to the question of isolation. The discussion here developed the opinions exhibited in the introductory addresses; but with those modifications, the general opinion was that in isolation is found the only safeguard against the disease.

That opinion was greatly intensified by the statements of Dr. Hansen, who followed the history of the disease in Norway, in relation to isolation. He not only proved his contentions from the statistics of Norway as a whole, but increased the force of his argument by the study of the movement of leprosy in the various districts of that country, in which isolation had been practiced with varying degrees of exactness. His conclusion was that we have in isolation the only means of preventing the spread of the disease, and that the system of obligatory notification, of observation, and of isolation carried out in Norway should be recommended to all nations.

Professor Besnier thought that all measures looking to the repression of the disease should be uniform in a given country, they should be considered in relation to the particular conditions prevailing, especially as to whether there is or is not a leprous focus existent.

Dr. Thibierge (Paris) considered that in countries where the disease was rarely propagated all measures should be the reverse of vexatious and that the careful examination of all persons coming from leprous countries is impracticable. Soldiers returning from a campaign in such countries, and sailors employed in colonial and convict service, could be treated as suspects. He considered the obligatory declaration of cases of leprosy as impracticable and isolation as not only unpopular but unnecessary, because the products of leprous ulceration could be rendered harmless in any hospital and in most homes at less expense and with sufficient advantage to replace isolation.

Dr. Ehlers (Copenhagen) said that Denmark was about to adopt the Norwegian law, with perhaps some modifications, and that a leper hospital would be opened in Iceland in 1898.

Dr. Alvarez (Honolulu) stated that the strict law in force in Hawaii for thirty years had disappointed those who had predicted that it would be the means of stamping out the disease. While the law had been useful in keeping the disease in check, he was opposed to rigorous or cruel measures, as they led to the concealment of cases and thus defeated the object for which they were adopted.

Dr. Broes Van Dort (Rotterdam) thought that isolation was desirable, but that the sojourn in leper hospitals should be voluntary except for those who are without food or homes, living as mendicants. In these latter cases forced isolation considered, from a humanitarian and social point of view, is useful and indispensable. In general, there would be great difficulties in carrying out a law that did not agree with our modern and humane ideas, and impracticable for political reasons to obtain a law requiring a forced sojourn for all cases of leprosy. States possessing leprous colonies should have one or two leper hospitals in isolated places. The isolation should be voluntary except in the cases previously mentioned. Colonial governments should also give a subsidy to indigent lepers, under the condition that they establish themselves in villages set apart solely for lepers.

Hallopeau (Paris) considered it of prime importance to confine leprosy to the countries where it now exists. Admission of lepers by maritime ports should be prohibited in Europe. At each seaport passengers should be examined with that end in view and physicians of ships should be required to declare any case of leprosy on board.

Something was said in the conference, and more in the various papers submitted, of the good results attained by private efforts in various countries. In Livonia, with its population of nearly 1,500,000, considerable knowledge of the disease has been disseminated and a society has been formed which has established several asylums where lepers can be cared for and isolated. These establishments now have 280 beds. According to Dr. Dehio, there are about 600 lepers in Livonia. Other societies doing good work have been formed in Courland, Esthonia, and other parts of Russia, and in Iceland. In India, where there are not less than 100,000 lepers, not 2 per cent are under treatment. Something has, however, been done by private subscription, and at Bombay a leper asylum has been established, with 300 beds. In several parts of the country measures have been taken to provide to some extent for voluntary isolation. "Little, however, has been attempted in the way of legislation or the systematic management of lepers." Probably little will be done in that direction, as the commission appointed in 1890 reported that "the alarm about the increase of leprosy in British India is altogether groundless." This, at least, simplified the situation.

Various propositions were made from time to time in the conference, but only two were considered suitable for action and adoption.

The first was as follows:

We, the undersigned, propose—

That the leprosy conference, assembled in Berlin in 1897, shall appoint a commission, composed of 20 members, with power to increase its membership, which shall confer and prepare a plan for an international leprosy society.

The second proposition is a concise formula indicating the measures considered necessary for the control of leprosy. This proposition was made by Professor Hansen, without the limitation contained in its first paragraph, which represents an amendment offered by Professor Besnier.

It is as follows:

(1) In the countries where leprosy forms foci or has a marked extension we have in isolation the best means of preventing the spread of the disease.

(2) The system of obligatory notification, of observation, and of isolation carried out in Norway is recommended to all nations with local self-government and a sufficient number of physicians.

(3) It should be left to the legal authorities, after consultation with the medical authorities, to take the special measures applicable to the special social conditions of the districts.

This proposition was adopted without a dissenting voice, and is intended simply to indicate, in a general way, the line along which each government dealing with leprosy should formulate its measures of control.

The secretaries of the conference presented at the close of the debates the following general conclusions of the conference:

As might have been expected, a considerable portion of the discussion has related to the *Bacillus lepræ*, which the conference accepts as the virus of leprosy, and which for upwards of twenty-five years has been known to the scientific world through the important discovery of Hansen and the able investigations of Neisser.

The conditions under which the bacillus grows and develops are still unknown, as well as the way of its invasion into the human system, but from the discussions of the conference it seems probable that a unanimity of opinion will soon prevail in reference to its modes of subsequent dissemination within the human body.

Very interesting observations have been brought forward in connection with the elimination of the bacilli in large quantities by means of the skin and the nasal and buccal mucous membranes of lepers. It is desirable for such observations to be confirmed wherever opportunities occur, as the question is of very great importance to those who are intrusted with the care of the public health, inasmuch as leprosy is now acknowledged to be a contagious disease.

Every leper is a danger to his surroundings, the danger varying with the nature and the extent of his relations therewith, and also with the sanitary conditions under which he lives.

Although among the lower classes every leper is especially dangerous to his family and fellow-workers, cases of leprosy frequently appear in the higher social circles.

The theory of heredity is now further shown to have lost ground in comparison with the theory of the contagiousness of leprosy at present generally accepted.

The treatment of leprosy has only had palliative results up to the present time.

Serum-therapy has so far been unsuccessful.

In view of the virtual incurability of leprosy and the serious and detrimental effects which its existence in a community causes, and considering the good results which have followed the adoption of legal measures of isolation in Norway, the leprosy conference, as a logical issue of the theory that the disease is contagious, has adopted the resolution prepared by Dr. Hansen and amended by Dr. Besnier.

In this partial report of the proceedings of the international conference on leprosy many observations of considerable interest have doubtless been omitted. The published transactions will be to all peoples a mine in which can be found much valuable information and many exceedingly important suggestions.

The voice of the conference, it is confidently believed, will be heard in all civilized countries, proclaiming, if nothing more, that the plague, which for so many centuries has polluted and dragged down so many of the human race, is one of the contagious diseases and the hideous sister of syphilis and tuberculosis.

MEDICAL REPORT ON THE UNITED STATES MARINE BATTALION.

By JOHN M. EDGAR, *Surgeon, United States Navy.*

On April 22, 1898, the day following the declaration of war between the United States and Spain, the United States Marine battalion, numbering 23 officers and 624 men, embarked on board the U. S. S. *Panther* at navy-yard, Brooklyn, N. Y. This ship had arrived at the navy-yard at 11 a. m. the same day; immediately afterwards the embarkation of stores, to last three months, was commenced and at 8 o'clock was completed, so that the ship sailed at 9 p. m.

The men comprising the battalion had come from points between Norfolk, Va., and Portsmouth, N. H., and it is remarkable that no case of injury or sickness was consequent to this very rapid mobilization and embarkation.

We existed as a battalion from April 22 to September 20, or 152 days.

The following will show where we were employed during this time:

	Days.
On board the U. S. S. *Panther*	36
On board the U. S. S. *Resolute*	21
Time actually at sea	18
U. S. S. *Panther*, navy-yard, New York	1
U. S. S. *Panther*, Fort Monroe, Va	2
U. S. S. *Panther*, Key West, Fla	25
Camp Sampson, Key West, Fla	13
Camp McCalla, Guantanamo, Cuba	56
U. S. S. *Resolute*, Manzanillo, Cuba	2
U. S. S. *Resolute*, Fort Pond Bay, Long Island	2
Camp Heywood, Portsmouth, N. H	26

The *Panther*, though in many ways well adapted for a large body of men, yet had two main defects—insufficient ventilation, with marked lack of water-closet facilities, the space in sick bay too confined, when ship was used for transportation purposes—so that we had the after part of spar deck housed in and berths constructed.

The *Resolute* was much better fitted out for transportation purposes, having good ventilation, with much better water-closet facilities; sick bay not adequate, but a great improvement on the *Panther.*

Soon after the battalion was organized the medical department consisted of two medical officers, one apothecary, five enlisted men detailed as bay men, and six music boys as stretcher bearers. The bay men and music boys were drilled at stretcher exercises and the former also taught the various duties of first aid, and in a short period were quite proficient. All the men of the battalion were supplied with first-aid bandages and each squad leader had besides a field tourniquet. They were taught the application of both tourniquet and first-aid dressings. These lessons were continued until every man understood how the dressings were to be applied, and in the cases where men actually dressed wounds the bandages were accurately placed.

Four tents 14 by 16 feet were furnished the medical department. One was fitted and used for dispensary, the other three for patients.

Floors were raised half a foot from the ground, and two rows of canvas cots in each tent, in all, could accommodate 36. The canvas was that used on the *Panther* and *Resolute*, for the sleeping berths of the men, and when tautly stretched made a most comfortable bed for a warm climate.

Three main rules were laid down and instilled into the men:

First. Drink no water, except distilled, until it has been boiled.

Second. Keep out of the sun, unless exposure is necessary.

Third. If clothing becomes wet, change, if possible.

These three rules were nearly always followed, the first especially.

Drills occurred, and all labor possible performed, before 7.30 a. m.

Except when on picket, and during the early part of our stay at Guantanamo, the men slept on board flooring.

An extra allowance of coffee was served.

Frequent sea bathing was encouraged.

Taken as a battalion, and considering the exposure, the men enjoyed particularly good health, for we had no deaths from disease nor any seriously sick while on Cuban soil; yet our sojourn in a southern latitude caused everyone to lose from 6 to 35 pounds in weight, the average being about 14 pounds. There were two exceptions to above rule, for in these two cases, one gained 12 and the other 10 pounds.

In my opinion, it was an exceedingly wise policy that we went to Portsmouth, N. H., at this season of the year and remained at Camp Heywood for twenty-six days previous to sending the men to their different stations, since in every case the men have gained in weight and a coloring to the face, in marked contrast to its absence when they left Cuba.

La grippe had been epidemic at New York previous to our departure therefrom, and as a consequence we had 37 cases of this disease, the last one reporting on May 3. As sequela of this disease there were three severe cases of lobar pneumonia.

A case of morbilli reported on May 9, the infecting point being undoubtedly New York Barracks, since a case was transferred from there to hospital just previous to our departure. Number of cases were 13.

At Camp Sampson, Key West, Fla., we were encamped on sea frnot. Nothing particular occurred here aside from a number of the men wishing to become browned in too short a time, with consequences that included the treatment of eight cases of *sole excoctus*, five being aggravated. It was curious to see how little the men considered dangerous the swimming in close proximity to fairly good-sized sharks, for it was a daily occurrence to witness men bathing when several of these animals could be observed within 20 feet.

In so far as I could learn, Key West offers nothing conducive to health.

At Camp McCalla, Guantanamo, Cuba, the camp faced the bay and was pitched on a hill some 190 feet in height, an exception being that one company occupied the land below—level ground—a couple of feet above high water. Could observe no difference in health of those on hill from their fellows below.

Just previous to landing a number of frame houses that had been but shortly vacated, and their contents, were fired and destroyed to prevent any infection of the companies, and during our stay here a quarantine was established and fairly well observed against all ships and persons coming from parts of the country where yellow fever was known to exist.

But two diseases were of any importance at this camp:

First, malaria, and this mostly of the quotidian variety. Men who had previously suffered from this disease were mainly our patients. But a small proportion of all treated but had had previous attacks, though from the appearance of the surrounding country and knowledge gained in observing and treating the Cubans but too clearly showed that a prolonged residence, unless every hygienic rule was observed, would have given rise to severe types of paludial fevers. It was not found necessary to administer quinine regularly as a prophylactic, but a list was kept and those who had had previous paroxysms were given five grains daily.

Second, dysenteria acuta, of a mild type, was seen in a number of cases, and its origin attributed to sleeping on the ground, which was a military necessity for a part of the time. The patients were first given a mild purge, followed by varying small administrations of opium and lead acetate, with rest in bed, and a restricted diet was soon followed—in one to four days—with a disappearance of the blood-stained mucous stools.

A number suffered from dermatitis of the scrotum, attributed to heat and salt-water bathing. Cessation of baths and mild local treatment soon effected cures.

We had 6 killed at this camp—3 from gunshot wounds while on picket, 2 from gunshot wounds in action, and a third in action fell from an embankment, fracturing the cervical vertebræ. Besides the above, we had 14 other cases of gunshot wounds.

It was falsely rumored by those not versed in the explosive effects of the small-caliber bullet at short range that the first men killed, on picket, had been mutilated, but an examination showed this report to have been erroneous.

One of the first shot in action was Asst. Surg. John Blair Gibbs, who had, just a little while previous to the reception of his wound, been attending one of the injured in the hospital, and the firing becoming so continuous we attempted to take the sick to a place of greater safety. The doctor had not progressed 15 feet when he was struck by a small caliber ball, which passed through the head, from left to right temporal region. He expired half an hour later.

While at this place we had encamped with us 192 Cubans, who, in a couple of hours, constructed from palms shacks that answered well to protect from sun and rain. Upon their arrival and partaking of the regular food furnished our men, some half of them were attacked with acute diarrhœa and colic—was attributed to the salt beef and beans—they having existed for many months principally upon fruits. It would be entirely within a conservative limit to estimate that two-thirds of these men were suffering from the effects of the *Plasmodium malarialis*, thus showing the nature of the country and the exposure to which they had been subjected. Quinine was veritably their sine qua non.

REPORT ON THE DESTRUCTIVE FORCE OF THE UNITED STATES NAVY RIFLE.

By A. R. Wentworth, *Passed Assistant Surgeon, United States Navy.*

The following experiments were made at the slaughterhouse at Key West to ascertain the destructive force of the present United States Navy rifle (Lee straight pull), 6 mm. caliber, in comparison with that used by the United States Army (Krag-Jorgensen) at the present time. The ammunition for the former is as follows: The bullet is of hardened lead (95 per cent lead, 5 per cent antimony) with a jacket of cupro-nickeled steel. It is steel plated with an alloy of copper and nickel. The weight is 135 grains. The charge of powder varies in weight as it also may in kind. The ammunition issued at present is loaded with 33.2 grains of Troisdorf smokeless powder, which gives an average velocity to the standard bullet of 2,460 feet per second at 60 feet from the muzzle, with a chamber pressure of 49,000 pounds per square inch. With this velocity a penetration of 60 inches of pine at 5 feet is obtained. The penetration in steel boiler plate is about seven-sixteenths at the muzzle and three-eighths at 100 feet. The ammunition is in steel clips, 5 cartridges in each, and packed 4 clips in a box. The feed of the rifle from the magazine is by a steel spring. The army bullet is without the jacket, and somewhat larger, being about 7.5 mm.

Ten shots were fired from each into the viscera of a recently-killed beef under the following conditions:

(1) The stomach and intestines were placed over and in front of a spruce log, at a distance of about 100 feet, and a bullet fired into the stomach containing contents as removed from the animal. The wound of entrance was, as usual, clean-cut and of small diameter, but wound of exit was a ragged irregular wound, about 1½ inches in diameter, showing either a wound caused by force of impact of the bullet or the stripping of the jacket. No portion of the cupro-nickel steel could be found. The log, 10 inches in diameter, was found pierced by the bullet, showing that no explosive force had taken place in the bullet per se. The army rifle was tried under the same conditions, and the result was a clean-cut wound of small size, both of entrance and exit.

(2) The small intestines were then placed in an exposed position above the log; they contained only a small amount of liquid. The first shot struck at a slight angle and was deflected, causing a clean-cut wound through the tissues and muscular fibers 3 inches in length; a second pierced the same, wound of entrance and exit being similar. The result was the same with the army rifle.

(3) Thinking that the first result of enlarged wound of exit might be due to a solid background, I obtained permission to fire into a stomach and intestines that had been thrown upon the floor of the slaughterhouse, with nothing to resist the force of impact. The results were materially the same, the liquid spouting from the former while the semi-solid mass oozed from the latter, and several small wounds in the direction of the flying bullet were found in other viscera. The wounds of the army bullet corresponded to my first experiment.

(4) What was the effect of the bullet upon bony substances? The head of an ox was placed at a distance of 20 paces, the head so placed as to have no resistance at the back and easily knocked out of position. The bullet passed through the upper section without dislodging it (the head), causing a small wound of entrance, but a ragged wound at exit, surrounded by shattered particles of bone, about 1 inch in diameter. A second shot was fired, that pierced the outer angle of the orbit, grinding the bone in its course to small fragments and fracturing the angle of the malar with the frontal bone, finding exit in

the corresponding bone to the parietal; wound irregular, with ragged edges; army rifle not tried, as it was late in the day.

The above experiments were tried under very unsatisfactory circumstances and are by no means conclusive, but correspond with experiments formerly tried, to which my attention was called by an officer after I had returned on board.

Experiments abroad with the bullets of calibers .315 to .236 inch, with full charge, for effect on bone and tissues of human body and animals lead to conclusions similar to those published in the Journal of United Service Institute, January 15, 1894, British army, as follows:

At a range of from 250 to 200 yards and from 300 to 2,000 yards.—"The first group comprises those injuries resembling in appearance those of an explosive character; the parts always pounded, fragments frequently carried out through the wound of exit, which is commonly converted into a gaping orifice; the muscles are pulped and the limb mangled and damaged beyond repair. If the bullet simply passes through muscle, it practically does no damage of any importance unless it strikes an artery, which, large or small, is cut as with a knife, causing hemorrhage; but because of the small size of the bullet the blood vessels and nerves stand a better chance of escape than with the larger bullet. In considering the nature of injuries inflicted on bone at a distance between 300 and 1,000 yards it is clear that they have a tendency to resolve themselves into, first, comminuted fractures and pulverizing of the resisting part of bone; second, comparatively clean holes in the nonresisting regions, such as extremities of the bone. It is evident that a wound near a joint may be much more dangerous than one some distance from it, which is in reality a surgical paradox."

July, 1897, the effect of the dum-dum bullet.—"Surg. Capt. G. S. Mansfield, medical staff, has drawn up an instructive report on experiments with a special dum-dum bullet, carried out before the commander in chief in India, at Murett, in December, 1896. These experiments, which were intended to demonstrate the amount of "set up" and "stopping powers" in the bullet, were made, says the Times of India, on the carcasses of freshly killed sheep tied up in various positions, some with the fleece on and others with the outer skin, fleece removed. Except in one instance the range was 200 yards, and the sheep was fired at broadside on, diagonally, and facing the shooter; in the last-named position the long axis of the body being exactly in line with the line of fire. The most remarkable result of the experiments was the large size of the wound of exit as compared with the smallness of the wound of entrance. One bullet fired at an unskinned sheep broadside on passed between two ribs, making an entrance wound no larger than a big pea, but after shattering one of the spinal vertebræ it smashed two ribs and produced an exit wound as large as a crown piece. Another bullet, fired under similar circumstances, entered the abdomen behind the last rib, making a wound of entrance as large as a 3-penny bit. On its exit a hole was torn in the opposite wall of the abdomen the size of a large orange. Yet another bullet fired at the same sheep pierced the lower jaw at its angle, making a hole in the skin no bigger than a pea, but on examination it was found that the bone was completely shattered. A bullet was also fired through the thigh, struck the pelvic bone, which apparently offered such resistance that an exit wound 2½ inches in diameter resulted. Surgeon Mansfield regards as particularly important the case of a bullet which entered through the front of the shoulder joint by a very small opening and, passing through the joint, completely disorganized it. The articular ends of the bones were smashed into over a dozen pieces and there was a great loss of substance. Under these conditions excision of the joint or more possibly amputation of the limb being the only remedy available. The efficiency of the dum-dum bullet is especially vindicated by the character of the wounds, which only affected the soft parts. From these wounds he infers that a bullet penetrating the muscular tissues only—such as that of the human thigh—will 'set up' sufficiently to cause a severe wound, quite enough to effectually stop the progress of the man or horse struck. It has been noted that all the shots except one were fired at a range of 200 yards. The exception was that of a shot fired at 50 yards from the animal. It struck the sheep's abdomen, soft parts alone being injured; yet, though the wound of entrance was small, the bullet on emerging tore a hole the size of an orange. This shot exemplifies beyond all reasonable doubt the superiority of the new bullet over the old one. Bullets manufactured by the new method do not produce clean-cut wounds at close range, as was the case with old bullets, but are shown to produce an exceptional 'stopping power.'"

The wounds inflicted by an accidental discharge while at target practice on board this ship January 12, in the harbor at Key West, showed, in the case of McDevitt (seaman), who was shot through the arm, the destructive force of the bullet of the present navy rifle; entering the arm about 2 inches above the elbow at its outer side, passed downward, shattering the outer condyle of the humerus, breaking it into four pieces, and sending myriads of fine particles into the muscular tissues, fracturing the head of the radius about 1½ inches below the joint and finding an exit through the radial muscles, lacerating and destroying muscle as well as external tissue to a frightful degree. Excision of the head of the radius was performed about 2½ inches below the joint after the removal of bony fragments and destroyed tissue. At present patient is doing well and will regain partial use of the arm; flexing and extending without much difficulty, but rotation is not performed without assistance and then with some pain. The middle and ring fingers are partially flexed, which is doubtless due to an injury of the radial nerve and affecting in some unknown way the internal branch of third part of that nerve as well as the ulnar and musculo spiral.

A second bullet at the same time passed through a one-half-inch brass rim of a deck ventilator, with a downward angle through the main portion of the ventilator, which was one-sixteenth-inch iron, and from the flying fragments of this bullet seven persons were injured, three of whom were taken to hospital; in some cases as many as seven or eight small wounds were caused and some queer conditions afterwards ascertained. In one case, a single wound at entrance, sinuses extending almost at right angles to a depth beneath the skin of 2½ inches were found. In a second, examined by an X-ray, in a wound of the thigh the main portion of the leaden fragment was found buried quite near the bone, while four other pieces were located lower down and more superficial.

A third bullet, or possibly the one which passed through the arm of McDevitt, passed through a 4-inch deck plank and a half-inch steel deck, dividing into two parts, one of which glanced and passed out of the torpedo port, leaving a perceptible scar on the paint, and the other struck with some force the iron frame of the galley.

REPORT OF SERVICES PERFORMED AT THE ARMY HOSPITAL, SIBONEY, CUBA.

By GEORGE D. COSTIGAN, *Assistant Surgeon, United States Navy.*

I have the honor to report the following in reference to my recent visit to the United States Army hospital camp at Siboney, Cuba, such visit extending from July 8 to 10, inclusive.

The camp is situated upon a level stretch of ground at the foot of the bluffs back of Siboney, about 300 yards from the beach and facing it.

The wards, arranged in rows about 20 feet apart, are composed of tents placed end to end and so situated that they receive the full benefit of the sea breeze.

The dressing tent, originally employed also as the operating tent, is situated about the center of the camp and contains six tables for the reception of the wounded, with all necessary appliances for dressings, operations, and antisepsis.

During the last day of my visit a tent to be used entirely for operations had been erected; a water-closet and urinals on the beach built; barrels for the reception of refuse, to be burned when filled, had been conveniently placed, and the streets of the camp and floors of the wards had been cleaned.

The wards were supplied with wire spiral-spring cots and a number of small tables and chairs, and, with the exception of suitable clothing in the shape of pajamas and nightshirts, the wounded were as comfortable as the arrangements of a field hospital will permit.

The water was derived from a spring in the hills some distance back of the camp, and was ample in quantity as well as of good quality. It was piped to the camp along the surface of the ground, and the temperature it thus obtained during the middle of the day rendered it almost unpalatable and far from refreshing.

Each man on the firing line was supplied with a "first aid package," containing a piece of sterile gauze, absorbent cotton, bandage, and safety pins. The application of this first dressing immediately upon the reception of a wound accounts, in a large measure, for the very noticeable absence of subsequent suppuration.

Upon the receipt of a wound those unable to walk were carried to the rear, by the litter-bearers, to the first dressing station, and were there attended until they could be conveyed in ambulances to the camp at Siboney, 7 or 8 miles distant. At this first hospital necessary operations were performed, wounds cleansed, and antiseptic dressings applied.

Upon their arrival at Siboney the wounded were transferred direct from the ambulances to the dressing tent where their wounds were again examined and redressed by the surgeons in attendance. In many instances this exposure of wounds to inspection proved to be unnecessary, but as no definite idea of the extent and nature of the injury could be ascertained from the diagnosis tags attached to each, examination was deemed advisable in each case.

As soon as yellow fever made its appearance each ambulance was inspected by a specialist before the wounded were removed, and suspicious cases were transferred at once to a hospital for their reception, about 1½ miles distant. Each case that made its appearance among the wounded previously received was transferred immediately upon detection.

At the time of my arrival at the camp the large majority of cases requiring operation had been attended to or transferred to the hospital ship *Relief*, or to one of the transports employed for the same purpose. A few cases of wounds of the skull were operated upon—fragments of bone removed and trephining performed where necessary—and draining was instituted in a few cases of cellulitis of the leg.

The wounds produced by the Mauser bullet did not show the explosive effect upon the soft tissues that was anticipated, and, in the opinion of some Army officers, this was due either to the fact that the Spaniards were using defective powder or that the velocity of the bullets was greatly decreased by passing through the dense undergrowth and brush on the site of the battle.

An explosive effect was shown when the bullet struck a bone and was made to tumble, and in these cases, even when there was no fracture, the wound of exit was often large and irregular in outline. In a wound of the soft parts alone no, or only a very slight, explosive effect was observed, the wound of entrance being about the same size as the caliber of the bullet, while the wound of exit is slightly larger and shows more evidence of contusion about its borders than the former. In every case the wound of exit can be easily determined from that of entrance.

In injuries of the bones of the skull there was more or less comminution at the point of exit, and in every case of injury of the long bones of the extremities that I saw there was extensive comminution of the bone and laceration of the soft parts adjoining. A number of cases of perforating wounds of the thorax and abdomen in which the viscera were injured were, at the time I saw them, well on the way to recovery without having received any operative intervention. The large majority of the wounds made by the Mauser bullet showed a tendency to heal readily with little or no suppuration, especially in those cases where the first dressing, on the field, had been promptly and properly applied.

The brass-jacketed bullet from the Remington arm produced severe laceration of the soft parts and comminution of the bone in each case I saw. Upon striking bone this bullet became altered in shape, the jacket split in several places, principally in the long diameter, became partially detached from the lead, and the several edges thus formed curled up so as to act as cutting edges. These wounds were more septic than those produced by the Mauser, and the bullets frequently carried particles of clothing into the tissues with them. As near as I could learn, suppuration occurred in every case of extensive shell wound, especially in those of the extremities where amputation was necessary.

Bichloride of mercury in solution was the antiseptic most commonly employed, carbolic acid in weak solution being used in all cases of injury of the brain. Every antiseptic precaution that is possible in a field hospital was observed in dressing the wounds and in operating, and served to materially decrease the mortality of military surgery.

REPORT ON SERVICES PERFORMED AT ARMY HOSPITAL, SIBONEY, CUBA.

By MIDDLETON S. ELLIOTT, *Assistant Surgeon, United States Navy.*

On the evening of July 2, 1898, I was ordered to go ashore from the *New York* and report at the army hospital at Siboney, and render what assistance I could.

The following is a brief description of the hospital camp and summary of work done from July 2 to 6:

The situation of the hospital was fairly good, being on a small sloping plateau. The operating tent was in the center and the tents for patients on either side.

There was an abundant supply of pure water, which was brought down in pipes from several hundred yards up a ravine. One hydrant was at the opening of the operating tent.

The operating tent contained five operating tables, each occupied by one or more surgeons. Each surgeon had several assistants, or nurses, who remained at that table. The general supervision of supplies, dressings, etc., was under the direction of a steward.

As soon as one patient was removed from a table another was brought in. The severely injured were placed in cots, but a large number were allowed to move about. Each tent contained from 50 to 75 patients, and was in charge of a steward and several nurses. Each patient after being dressed or operated on was tagged with the nature of the injury and when next to be dressed. The tag also had on it the patient's name, company, and regiment.

All the wounded were dressed with the first-aid dressing on the field and received their second or permanent dressing at the division hospitals or at this hospital. All wounded were sent to this hospital as soon as they could be moved. Many patients were redressed when it was unnecessary. These patents were not tagged, and there was no way of telling what was the nature of the injury or what was done to them.

In the operating on and dressing of cases aseptic and antiseptic methods were strictly followed. Of the number of cases seen only about six were infected, and this was caused by the displacement of the first-aid dressing.

The character and situation of the wounds varied greatly. The extremities were wounded more often than other parts of the body, but the number of wounds of the head exceeded those of the trunk. Of between 150 and 175 cases operated on and dressed by Asst. Surg. Raymond Spear, U. S. N., and myself, only one amputation was done, that at the shoulder, where there was extensive laceration of the hard and soft tissues of the arm, with indications of beginning infection. This case did well.

The dressings used were done up in original packages and were not opened until they were to be used. The instruments were sterilized after each operation.

Chloroform was the anæsthetic used entirely, and it was administered to several hundred patients without any bad results.

In comparison, there were a large number of wounds of the head, and while no deaths occurred at that time, many must have resulted fatally later, as in many cases the bullet remained in the brain substance. All that could be done at that time was to remove fragments of bone and relieve pressure. This often was done by the light of one lantern and three candles. Men wounded in the chest invariably did well, many who were shot through the lungs being able to walk about. Two cases of traumatic pneumonia were noticed.

The action of the Mauser bullet was very interesting, being very different, as a rule, from what experiments had led one to expect. The wound of entrance is very small, and the wound of exit is so similar in appearance that it was hard to distinguish between the two. Care had to be taken to find the wounds at all. The injury done to the soft tissues was very slight, there being little effusion. In some cases where the bone was struck, it was as smoothly grooved as if done by hand. The splintering was much more marked in the joints. A large number of the bullets were found embedded in the tissues, and most of them were flattened or curved. In contrast to the effect of the Mauser, several of the men were wounded with the large caliber brass-jacketed bullet. The injuries in these cases were much more marked, the bone being pulverized and the soft tissues badly torn. In one case where a large bullet struck the shoulder joint, the whole joint was shattered, and a complete excision had to be done. The bullet traveled down the chest wall and was removed in the axillary line over the lower border of the liver. The brass jacket was partially stripped from the lead.

Only one fatal case of abdominal wound was seen. This boy was moribund when brought on the table. No operation was done. Several cases of traumatic aneurism were seen, and one operated on.

In the wounds of the extremities, the lack of fixed dressings was apparent. There were so many urgent cases that there was not time to apply them, although in important cases it was done. Many lives were saved by the first-aid packages. Their utility could be greatly increased by incorporating in the package some antiseptic powder, as suggested by Dr. Senn. In many cases the dressing became displaced and exposed the wounds to infection, which could be avoided if a powder be used, forming as it does an impervious crust over the wound.

Every variety of gunshot wound was seen, and the conclusion is that the modern small-bore arm is a much more humane weapon than those of larger caliber.

REPORT OF SERVICES PERFORMED AT THE ARMY HOSPITAL, SIBONEY, CUBA.

By RAYMOND SPEAR, *Assistant Surgeon, United States Navy.*

I have the honor to state that in response to a request for medical officers at Siboney, Cuba, by the surgeon in charge of the army hospital, Surg. M. H. Simons, of the *Iowa*, Asst. Surg. M. S. Elliott, and myself were detailed, and reported to Major La Garde at the army hospital on July 2, 1898.

We worked all that night. Dr. Simons returned to the U. S. S. *Iowa* the following morning. Dr. Elliott and myself remained until July 6, working almost continually during our stay at the hospital.

The hospital was composed of tents which were placed on the slope of a hill near some wooden houses, in which yellow fever developed afterwards.

The place in which the operations were performed was composed of six tents placed end to end, and in this tent there were six operating tables.

The fighting line was about 8 miles distant from the hospital, and, as the country was very rough, many of the wounded men were much exhausted after their long ride or walk, as the case may have been, on their arrival at Siboney. All the wounded received first-aid dressings either on the field or at a divisional hospital.

When the wounded arrived at the hospital, they were placed in the receiving tent, and from here they were taken into the operating tent and their wounds dressed and necessary operations performed. On the patient was placed a tag stating his name, rank, company, regiment, injury, what was done, and when the wound should be redressed.

From the operating tent the wounded were carried to the hospital tents proper and placed on cots. The worst cases were grouped into separate tents.

There were so many patients that at times it was several hours before all could be attended to. There were not enough cots, and some had to sleep on blankets placed on the ground.

In charge of the hospital tents there were detailed two army surgeons, and for nurses they had what were called "hospital men," detailed to look after the injured.

At first the question of feeding the wounded was quite a serious one. The chaplain by hard work remedied this, and when we left, the patients were getting regular meals.

In the operating tent there were three trained female nurses, who rendered invaluable service. They demonstrated the good results of special training, and not only employed antiseptic and aseptic measures in all their work, but they also worked longer and harder than any of the regular hospital stewards, and by their foresight greatly expedited operations where time meant the saving of life. There were several female nurses placed in the hospital tents; these also did excellent work; they demonstrated conclusively that female nurses are of invaluable service wherever there are wounded or sick men to be cared for.

Together, Dr. Elliott and myself operated on and dressed about 150 cases. The operations performed included brain cases, excisions, resections, amputations, aneurisms, etc.

The wounds treated were produced by Mauser bullets, .43 caliber brass-jacketed bullets, and by pieces of shell.

The wounds were very easy to distinguish; the small Mauser bullet many times made nothing but a small perforating wound, the tissues not being lacerated in the least. When they struck a bone, the latter was either perforated, grooved, or splintered, but never badly, very few, if any, amputations being required from this cause. The brass-jacketed bullet, on the other hand, lacerated everything it struck, soft and hard tissues alike. The injuries from the fragments of shell varied according to the size of the piece of projectile, from slight to severe wounds. The wound of exit of almost all the bullet wounds was larger than that of entrance. Many times, however, the exit wound produced by a Mauser bullet was about the same size as the entrance wound, and it was with difficulty that they could be distinguished.

Quite a number of Mauser bullets were found lodged in the tissues. Some of the missiles were bent, showing that they had struck some object before inflicting the wound. Some of the cartridges captured from the Spaniards showed the effects of exposure to the weather; the bullets could be pulled out of their brass cases very easily. The lodged bullets can also be explained in some cases by the fact that they went through grass and bushes before they reached the bodies of the men they wounded. The ranges were close, sometimes from 100 to 400 yards.

Most of the killed received their wounds in the head or abdomen. Most of the abdominal cases died before they were brought to the hospital.

There were a number of penetrating and perforating wounds of the brain. All these cases were operated on; splinters of bone, and in several cases the bullet, were removed from the brain substance. These cases, as far as we observed them, all did well.

There were a few cases of undoubted heart wounds that presented no symptoms of injury to this organ.

Lung wounds were common. There were two punctures of the lung tissues in several cases. These cases presented ordinarily few symptoms, slight pain on breathing and a little hæmoptysis. These wounds healed almost always by first intention. The small bullet seemed to injure the lung substance no more than an aspirating needle in many cases. There were a few traumatic pneumonias.

The liver seemed to be able to withstand punctures by the small bullet very well; several of these cases presented no symptoms.

There were a few cases of abdominal puncture by the Mauser bullets that presented no symptoms except slight shock and pain. These cases were seen three or four days after the receipt of the wound, and showed that it was possible for a ball to penetrate the abdomen at a high velocity and the patient still live. These cases were rare.

The arteries did not escape the Mauser. There were quite a number of severed or injured arteries, which resulted in traumatic aneurisms. These cases presented a pulsating tumor, discoloration of the surrounding parts by effused blood, and pain, due to pressure on the surrounding nerves.

The wounds of the bones were very interesting. As already stated, the wounds of the bones made by the Mauser bullet were never severe enough to demand amputation of an extremity; at least we saw no such case. By conservative surgery many limbs were saved. In no wound produced by a Mauser bullet did we see any clothing or foreign bodies; the wounds were almost always aseptic, unless they had been exposed to infection in not being dressed, or in being infected on account of the dressings slipping.

The percentage of infected cases was small. This was probably due to the first-aid dressings that were applied. Some of the men, being under fire, could not have their wounds dressed for several hours, and the infected cases usually gave this history. This shows the importance of an early dressing for a wound.

The Mauser bullet leaves practically no scar in many cases, consequently the disfiguration of the contestants in the present war will not be as great as it was in the war of the rebellion.

SPECIAL APPENDIX.

Including:

Statistical report of casualties occurring on the U. S. S. *Maine.*

Detailed account of casualties of the Spanish-American war, with disposition of cases.

General view of health of Navy and Marine Corps during period of hostilities (April 21 to August 12, 1898), together with statistical tables relating to North Atlantic Squadron, Marine Battalion, and Asiatic Squadron.

STATISTICAL REPORT.

CASUALTIES OCCURRING ON THE U. S. S. MAINE.

The U. S. S. *Maine* was destroyed in the harbor of Havana on the night of February 15, 1898, as the result of the explosion of a mine under the forward portion of the ship.

The complement at the time of the disaster was 355—290 sailors, 39 marines, and 26 officers. Of this number 251 men and 2 officers were killed or drowned and only 102 saved. Seven of this number died subsequently of their injuries, making the number of survivors 94. This gives as the appalling percentage of loss practically 75 per cent of those on board. The greater proportion of deaths among the men than of the officers was due to the fact that the after portion of the ship in which the latter were quartered was comparatively uninjured. The completeness of the destruction of the forward compartments of the vessel is evidenced by the fact that of the bodies of the dead only 178 were recovered, 30 per cent of the number remaining in the wreck, notwithstanding the work of recovery was continued until April 6. This is attributed to the fact that the men were swinging in their hammocks over the part of the ship in which the force of the explosion was centered.

Of the 77 rescued sailors and marines, only 16 were uninjured.

The cause of death in the 7 cases reported from Havana was extensive burns covering greater portion of body in 6 of the number, and compound fractures of inferior maxilla and right femur in the seventh.

Of those injured and subsequently transferred to the United States marine hospital and army post hospital at Key West, Fla., 26 per cent were under treatment for wounds, 4 per cent for fractures, 6 per cent for dislocations, 30 per cent for contusions, and 34 per cent for burns. Notwithstanding the large number under treatment at these hospitals and the serious character of many of the injuries, there was not a single death.

One of the officers has since died of a cerebral affection attributed to the shock sustained at the time of the explosion.

Medical surveys have been held on 6 of the men who belonged to the *Maine*, and of this number 5 have been invalided from the service by reason of the following disabilities: 1, sprain of back; 2, chronic pleurisy; 3, neurasthenia and deformity of nasal bones; 4, deformity of right hand; 5, partial paralysis of muscles, right side of face; partial ankylosis, lower jaw; impaired hearing. All of these conditions were attributed to injuries received at time of the destruction of the *Maine*.

NAVAL CASUALTIES OF SPANISH-AMERICAN WAR.

(Covering period of hostilities—April 21 to August 12, 1898. Arranged in order of engagements and by vessels on which they occurred.)

BATTLE OF MANILA BAY, MAY 1, 1898.

U. S. S. BALTIMORE.

Case No. 1.—Lacerated wound of upper lip by fragment of rotating band. Also wounds of right foot, in one of which there was fracture of the fifth metatarsal bone extending into general synovial sac. Patient discharged to duty, entirely recovered, June 10. On the list forty days.

Case No. 2.—Lacerated wound (1¾ inches long) just below sterno-clavicular joint. Healed by first intention. Discharged to duty May 7. On the list six days.

Case No. 3.—Compound fracture of left leg in upper third from a fall while carrying an 8-inch shell, the point entering the inner side of leg and splintering inner border of tibia. Discharged to duty, entirely recovered, June 7. On the list thirty-seven days.

Case No. 4.—Contusion and concussion. Was knocked down by the windage of a 4.7-inch shell. Face badly bruised, and unconscious for one-half hour. Discharged to duty May 7. On sick list six days.

Case No. 5.—Wound of left leg from splinter. Not admitted to sick list.

Case No. 6.—Wound of left forearm. Contusion of left sterno-mastoid and rupture of left tympanic membrane. Not admitted to sick list.

Case No. 7.—Wound of right foot and abrasion of face from splinters. Not admitted to sick list.

Case No. 8.—Contusion over sternum and abrasion side of face. Not admitted to sick list.

U. S. S. BOSTON.

Case No. 1.—Punctured wound of right cheek from flying splinter. Not admitted to sick list.

ENGAGEMENT OFF CIENFUEGOS, CUBA, MAY 11, 1898.

U. S. S. MARBLEHEAD.

Case No. 1.—Gunshot wound of head. The bullet entered at center of frontal bone and made its exit at upper margin of occipital bone, shattering the calvarium, the bones being freely movable under the scalp. Patient lived one hour after receipt of injury, but did not regain consciousness. The hemorrhage was very severe.

Case No. 2.—Gunshot wound of right thigh. The bullet entered at lower external third, splintering and comminuting the femur to such an extent that fragments of the bone were subsequently found embedded in anterior tibial muscles. Ball passed out opposite wound of entrance. Very little hemorrhage. Patient was transferred to the army barracks hospital, Key West, Fla., where, after consultation, it was decided that amputation was demanded. The operation was performed May 14, death ensuing very shortly after the operation. Number of days on sick list, three.

Case No. 3.—Gunshot wound of right leg caused by Mauser bullet. The projectile passed through calf of right leg, wounding external saphenous nerve. No injury to bone. Patient was transferred to *Solace*, thence to army general hospital, Key West. Patient was admitted to naval hospital, New York, June 5. Upon admission to hospital, wound had practically healed. There was numbness and loss of motion of toes due to nerve implication. Discharged to duty July 6. Number of days on sick list, fifty-six.

Case No. 4.—Gunshot wound of liver. The bullet passed through right lobe of liver, entering at lower border and making its exit about 2 inches external to the spinal column. The shock was very severe, but hemorrhage slight. Patient was transferred to army barracks hospital on May 14, where he remained to May 28. Was under treatment at army general hospital until June 1, when he was transferred by *Solace* to naval hospital, New York. Upon admission, wound was found to have healed. Abdominal bandage employed in order to relieve sensation of weakness complained of about hepatic region. Patient suffered at intervals from nervous and bilious attacks, and was invalided from the service July 25. Number of days on sick list, seventy-five.

Case No. 5.—Gunshot wound of right buttock. The projectile entered external surface of buttock, transversing gluteal muscles and making its exit about 1 inch from anus. Patient was under treatment at army general hospital, Key West, and was discharged to duty June 6. Number of days on sick list, twenty-six.

Case No. 6.—Gunshot wound, the bullet entering posterior border of left sterno-cleido-mastoid muscle, passing through subcutaneous tissues, shattering lower jaw below angle, and making its exit through open mouth. Fragments of bone and seven of the teeth removed. Hemorrhage was very severe. Patient was under treatment at army barracks hospital, Key West, and on June 1 was transferred by *Solace* to naval hospital, New York. Upon admission there was found a sinus below and anterior to ear, leading to necrosed bone. There was considerable swelling along track of sinus, from which were removed at intervals fragments of teeth, bone, and metal. On September 9 an abscess formed in tissues of neck below angle of jaw, which was incised and an impacted tooth removed. Condition improved greatly after the operation, and on October 3 patient was transferred to naval hospital, Chelsea, where he continues under treatment (October 20) and is recorded as doing well. Number of days on sick list (October 20), one hundred and sixty-three.

Case No. 7.—Two gunshot wounds, one situated at back of right ankle and the other on outer side of right leg. Discharged to duty May 14. Number of days on sick list, three.

U. S. S. NASHVILLE.

Case No. 1.—Contused wound of left chest, above and to left of nipple, from impact of a deflected bullet. Absorption of effused blood occurred rapidly and patient was discharged to duty May 15. Number of days on sick list, four.

Case No. 2.—Gunshot wound of left hand, the bullet passing from ulnar side through the ring finger at junction of second and third phalanges, penetrating the joint. The dorsal surfaces of the middle and index fingers were lacerated. Patient made an excellent recovery except for slight stiffness of wounded joint. Discharged to duty June 6. Number of days on sick list, twenty-six.

Case No. 3.—Superficial wound of skin of left side of neck. Discharged to duty May 12. Number of days on sick list, one.

Case No. 4.—Superficial wound of forehead from jacket of deflected bullet. Discharged to duty May 12. Number of days on sick list, one.

Case No. 5.—Gunshot wounds of head and left chest wall. The projectile causing the wound of head entered at left parietal eminence, coursing downward and backward, furrowing the skull for about 1½ inches. No evidence of cerebral involvement. Patient was semiconscious, but gave evidence of shock. Later on it was decided that both tables of parietal bones were fractured, with apparently no injury to dura mater. On May 14 he was transferred to army barracks hospital, Key West, where an operation was performed, removing minute fragments of bone from wound. On June 6 he was admitted to naval hospital, New York, from the ambulance ship *Solace.* The wound of chest did not involve any of the ribs, the ball simply lacerating the tissues of left chest wall below axilla. A fragment of the cupro-nickel jacket was removed from this wound. Upon admission to naval hospital, New York, both wounds were found to be healed. Patient, however, was troubled with vertigo and obstinate headache. Discharged to duty September 22. Number of days on sick list, one hundred and thirty-four.

ENGAGEMENT OFF CARDENAS, MAY 11, 1898.

U. S. TORPEDO BOAT WINSLOW.

Case No. 1.—Lacerated wound right side of abdomen, with protrusion of intestines. Death instantaneous.

Case No. 2.—Lacerated wound of anterior cervical region, carrying away larynx. Death instantaneous.

Case No. 3.—Lacerated wound of abdomen, with protrusion of intestines. Death instantaneous.

Case No. 4.—Lacerated wounds of both thighs and of right side of abdomen below gall bladder. Died shortly afterwards, while being transferred in a boat to the *Hudson.*

Case No. 5.—Lacerated wounds of sacral region, upper anterior portion of left thigh, left lumbar region, over right scapula, of right heel and of left knee-joint, pulverizing bone. Death ensued shortly after reaching the *Hudson.*

Case No. 6.—Penetrating wound of left thigh, in Scarpa's triangle. Important blood vessels uninjured. Patient transferred to army general hospital, Key West, from which he was discharged to duty May 26. On sick list fifteen days.

Case No. 7.—Lacerated wound of right leg over anterior middle third. No injury to bone. Patient discharged to duty from army general hospital June 27. On sick list forty-eight days.

Case No. 8.—An abrasion of chest, evidently caused by spent fragment of shell. Discharged to duty May 12. On sick list one day.

All the casualties which resulted fatally were caused by the explosion of a small shell, probably a 10-pounder. The fragments into which the shell burst were not found in any instance in the wounds.

The hemorrhage from the various wounds was very slight, and there appeared to be but little suffering in those cases in which death did not ensue immediately. The bursting of the shell tore open a tank of green paint, with the result that not only was the deck in the immediate vicinity covered with paint, but two of the fatally wounded as well, and, owing to the fact of considerable heat having been imparted by the shell fragments and hot deck, this proved a very embarrassing feature in caring for the wounded. This engagement gave a total of sixty-four sick days.

ACTION OFF SAN JUAN, PORTO RICO, MAY 12, 1898.

U. S. S. NEW YORK.

Case No. 1.—Lacerated wound caused by a small fragment of a shell which exploded on board. The missile entered behind angle of jaw, left side, penetrating neck and base of skull, traversing brain substance and fracturing occipital bone at right lateral angle. Heart continued to beat five minutes, but no respiratory sounds could be detected. Death ensued.

Case No. 2.—Lacerated wound caused by fragment of shell which exploded on board. Point of entrance opposite right internal malleolus, near the tendo Achilles, producing slight wound. Recovery uneventful, and patient discharged to duty May 20. Number of days on sick list, eight.

Case No. 3.—Lacerated wound caused by fragment of shell which struck patient in middle third of left leg, entering in front of fibula, lacerating the muscles and scoring spine of tibia. There also was a contused wound of right buttock from a splinter of wood. The tissues surrounding wound of leg apparently devitalized by heat of shell fragment, causing delay in healing. Recovery was uneventful except for œdema of foot from venous obstruction, and patient was discharged to duty June 27. Number of days on sick list, forty-six.

Case No. 4.—Severe contused wound of calf of left leg, caused by some missile, probably a fragment of shell. On May 13 there was considerable swelling of muscles of calf of leg. The recovery was slow, owing to devitalization of tissues. Patient discharged to duty June 4. Number of days on sick list, twenty-three.

Case No. 5.—Compound comminuted fracture, caused by fragment of shell, which entered left thigh 4 inches above patella, passing through quadriceps extensor, comminuting femur for 3 inches, and making its exit to left of popliteal space, 3 inches above joint. There was also a slight wound of calf of right leg. On May 13 wounds of entrance and exit enlarged and fragments of bone removed. The fracture was located 2 inches above inferior epiphysis, extending upward for 3 inches. Ends of femur sawed off and brought together by silver wire suture and limb put up in a fenestrated plaster-of-paris bandage. Transferred May 14 to *Solace.* The patient was admitted to the United States naval hospital, New York, on July 20, having been under treatment at army general hospital, Key West, for twenty-five days. At time of admission the left leg was in a plaster splint. Wounds healed rapidly. Motion in knee joint limited to about 30 degrees. Moderate exercise was productive of muscular soreness. Patient was invalided from the service on September 1. Number of days on sick list, one hundred and twelve.

U. S. S. IOWA.

Case No. 1.—Contused wound of upper angle of right scapula, from fragment of shell which exploded on board. Not serious. Discharged to duty May 21. Number of days on sick list, nine.

Case No. 2.—Lacerated wound of right side, posteriorly, in sixth intercostal space, extending down to the bone. Caused by a flying splinter. Discharged to duty June 17, 1898. Number of days on sick list, thirty-six.

Case No. 3.—Compound comminuted fracture of right elbow joint, caused by a fragment of shell which exploded on board. Head of radius, olecranon, and outer condyle of humerus comminuted. Vessels and nerves intact. The ulna was fractured longitudinally for 2 inches from olecranon. Wound dressed aseptically and part immobilized. Patient was transferred to army general hospital, Key West, where the arm was amputated at junction of lower and middle thirds. On June 5 was admitted to naval hospital, New York, with a good stump. Invalided from the service July 27. Number of days on sick list, eighty-six.

ENGAGEMENTS AT GUANTANAMO, CUBA, MARINE BATTALION, NORTH ATLANTIC FLEET, JUNE 11 TO 20, 1898.

Case No. 1.—Gunshot wounds—one at level of fifth rib, the ball passing through chest from left to right side; the second projectile entering to left of umbilicus and making its exit just above crest of right ilium. Both wounds caused by small-caliber bullets and showed explosive effect. Death ensued.

Case No. 2.—Twenty-one wounds of head, neck, upper and lower extremities, from small-caliber bullets. Explosive effect marked. Death ensued.

Case No. 3.—Fifteen wounds of head, chest, and upper extremities, from small-caliber bullets. Explosive effect marked. Death ensued.

Case No. 4.—Gunshot wound of head from small-caliber bullet; wound of entrance at left temporal region, and that of exit directly opposite. Death ensued.

Case No. 5.—Gunshot wound from small-caliber bullet; point of entrance above eighth rib on left side in axillary line, projectile making its exit above sixth rib in axillary line of right side. Death ensued.

Case No. 6.—Fracture, with displacement, of cervical vertebræ from a fall from an embankment during one of the engagements. Death ensued.

Case No. 7.—Gunshot wound of right hand between first and second metacarpal bones, from premature discharge of his rifle (Lee-Metford). No injury to bones. Wound of entrance on palmar surface small; that of exit large. Injury received June 12. Transferred to ambulance ship, thence to naval hospital, Norfolk, and on July 21 to naval hospital, Philadelphia. Wound had healed entirely by August 26, the joints of thumb and index finger remaining stiff in spite of massage and passive movements. Invalided from the service October 10, 1898. Number of days on sick list, one hundred and twenty.

Case No. 8.—Gunshot wound from accidental discharge of his rifle (Lee-Metford). Entrance, palm of left hand; very large wound of exit, dorsum. Fourth metacarpal bone comminuted. Injury received June 12, 1898. Transferred to *Solace*, where wet antiseptic dressings were applied and part immobilized; thence to naval hospital, Norfolk, and on July 31 to naval hospital, Philadelphia. At time of admission to latter hospital wound had almost healed. By August 19 motion in first and second fingers normal, but that of third and fourth slightly impaired. He was discharged to duty in that condition, with the idea that enforced use would entirely restore function. Number of days on sick list, sixty-eight.

Case No. 9.—Gunshot wound of right arm; received June 13. Mauser bullet entered inner side at middle third and made its exit at point opposite. Injury to ulnar nerve, but none to bone. Transferred to *Solace*, thence to naval hospital, Norfolk, where he was admitted July 16, 1898. Discharged to duty July 21, wound entirely healed, but with some loss of sensation in little finger. Number of days on sick list, thirty-eight.

Case No. 10.—Wounded June 13. Mauser projectile entered one-half inch below right trochanter, making its exit at inner upper third of thigh, and reentering upper third of left thigh. No injury to bone. Bullet was removed and patient transferred to *Solace*. Admitted to naval hospital, Norfolk, July 16, and discharged to duty, wounds having healed readily, August 15, 1898. Number of days on sick list, sixty-three.

Case No. 11.—Gunshot wound of right arm from Mauser bullet; received June 13. Wound of entrance on external surface 1½ inches above right elbow; wound of exit very large (2½ inches in diameter) on anterior surface. External condyloid ridge of humerus injured. There was minute comminution of portion of bone struck, and soft tissues at wound of exit exhibited explosive effect of projectile. Patient transferred to *Solace*, thence to naval hospital, Norfolk, and on August 3 to naval hospital, New York. Upon admission the wound had practically healed, some ankylosis, however, remaining. Patient was surveyed September 7 and recommended to be retained for further hospital treatment. Continued under treatment. Number of days on sick list (October 20), one hundred and thirty.

Case No. 12.—Superficial wound over surface of left patella. Injury received June 13. Patient discharged to duty June 28. Number of days on sick list, fifteen.

Case No. 13.—Incised wound of calf of left leg. Injury received June 13. Patient discharged to duty June 18. Number of days on sick list, five.

Case No. 14.—Gunshot wound from accidental discharge of his rifle (Lee-Metford). Bullet entered 1½ inches above right ankle, anteriorly, and made its exit below and posterior to external malleolus. No bone injury. Casualty occurred June 14. Transferred to *Solace*, thence to naval hospital, Norfolk. Upon admission, July 16, wound had healed. While in hospital patient developed syphilitic lesions, by reason of which he was discharged from the service September 2, 1898. Number of days on sick list with injury, thirty-two.

Case No. 15.—Wound of terminal phalanx of left thumb; caused by Mauser bullet. Injury received June 14. Amputation performed at phalangeal joint. Transferred to *Solace*, thence to naval hospital, Norfolk. Upon admission to hospital, July 16, wound had practically healed. Patient discharged to duty July 25, 1898. Number of days on sick list, forty-two.

Case No. 16.—Gunshot wound of right hand from accidental discharge of his rifle (Lee-Metford). Injury received June 16. There was extensive comminution of proximal phalanges of index and middle fingers, necessitating amputation. Transferred to *Solace*, thence to naval hospital, Norfolk. Discharged to duty with satisfactory stumps August 12, 1898. Number of days on sick list, fifty-seven.

Case No. 17.—Gunshot wound of lower third of left forearm, with extensive comminution of radius and ulna, caused by premature discharge of his own rifle. Injury received June 16. The scaphoid and semilunar bones minutely comminuted. Transferred to *Solace*, where resection of radius, scaphoid, and semilunar bones was performed. Patient was admitted to naval hospital, Norfork, July 16, and transferred to naval hospital, Philadelphia, July 30. At this time wound was doing well and had healed entirely by September 24. Motion of wrist, however, was considerably impaired, particularly in flexion and extension. On October 6 but little motion of wrist and fingers and some atrophy of muscles in consequence. Massage and passive motion kept up. Patient remains in hospital. Number of days on sick list to October 20, 1898, one hundred and twenty-seven.

Case No. 18.—Gunshot wound of left hand from premature discharge of his rifle (Lee-Metford). Injury received June 16. Wound of entrance palmar surface, the ball passing through hand, shattering second and third metacarpal bones, and making its exit on the dorsal surface, causing an extensive wound of exit. Transferred to *Solace*, where the comminuted metacarpal bones were resected and part immobilized. Admitted to naval hospital, Norfolk, July 16. The wound was slow in healing, and the final result was thickening of the tissues of palm and stiffness of first three fingers. Discharged from the service September 16, 1898. Number of days on the sick list, ninety-two.

Case No. 19.—Wound of left foot from accidental discharge of his rifle (Lee-Metford), received June 16. Ball entered between heel and internal malleolus, making its exit in middle plantar surface. No injury to bone. Transferred to *Solace*, thence to naval hospital, Norfolk. Patient was admitted to naval hospital, Philadelphia, August 2, at which time wound had practically healed. He was discharged to duty August 30. Number of days on sick list, seventy-five.

Case No. 20.—Gunshot wound of left foot from accidental discharge of his own rifle (Lee-Metford), received June 20. Bullet passed through fourth toe, comminuting phalanges, also producing a lacerated wound of fifth toe. Transferred to *Solace*, where fourth toe was amputated. Admitted to naval hospital, Norfolk, July 16, and discharged to duty in excellent condition August 8. Number of days on sick list, forty-five.

Case No. 21.—Gunshot wound of left forearm from accidental discharge of a comrade's rifle, received June 20. Bullet entered at anterior surface, completely comminuting the radius for 3 inches in its middle third; ulna fractured at junction of middle and lower third; muscles extensively lacerated; vessels intact. Transferred to *Solace*, where the radius was resected and ulna sutured. Aseptic dressing applied and part immobilized. Admitted to naval hospital, Norfolk, July 16, and transferred August 1 to naval hospital, Philadelphia, where he is still under treatment. The wounds of entrance and exit have healed, with exception of slight crust on latter. Fibrous union has resulted, with impaired motion of hand and fingers; pronation and supination being lost. A skiograph, taken October 13, indicates that resection of both bones will be necessary. Patient remains in hospital. Number of days on sick list to October 20, one hundred and twenty-three.

Case No. 22.—Gunshot wound of last phalanx of left great toe from accidental discharge of his own rifle (Lee-Metford). Patient discharged to duty. Number of days on sick list, fifteen.

ENGAGEMENT OFF SANTIAGO, JUNE 22, 1898.

U. S. S. INDIANA.

Case No. 1.—Gunshot wound of right leg from accidental discharge of a revolver. Ball entered calf of leg in the middle and to inner side, taking its course upward and outward for 3½ inches. Wound dressed aseptically and patient discharged to duty well, July 2. Number of days on sick list, ten.

U. S. S. TEXAS.

Case No. 1.—Lacerated wounds from explosion of a 6-inch shell. The body was mangled and partly dismembered. Death was instantaneous.

Case No. 2.—Lacerated wound in front of right ear from fragment of shell. Wound dressed and patient discharged to duty same day. Number of days on sick list, one.

Case No. 3.—Lacerated wound of left forearm and contusion of left popliteal space from fragments of shell. The wound of forearm involved only soft parts. Upon exploration no fragments of shell could be found. Discharged to duty July 3. Number of days on sick list, nine.

Case No. 4.—Lacerated wound of right great toe. Fragment of shell removed from wound and aseptic dressing applied. Discharged to duty June 22, 1898. Number of days on sick list, one.

Case No. 5.—Contused wound behind right ear from fragment of shell. Not serious. Discharged to duty June 22. Number of days on sick list, one.

Case No. 6.—Lacerated wounds of right thigh and left leg from fragments of shell. Careful exploration failed to reveal any of the fragments in the wounds. Gauze drainage was employed and aseptic dressings applied. Patient was transferred to *Solace*, thence to naval hospital, Norfolk, where he was admitted July 16, and discharged to duty July 23. Number of days on sick list, thirty-one.

Case No. 7.—Flesh wound about 2½ inches in length, extending down to great trochanter of left femur. Patient transferred to *Solace*, thence to naval hospital, Norfolk, where he was admitted July 16. The wound healed perfectly, and he was discharged to duty August 29 in excellent condition. Number of days on sick list, sixty-eight.

Case No. 8.—Burns of forehead, eyelids, right ear, nose, lips, left hand, and right wrist from powder flash of bursting shell. Injuries superficial and shock very slight. Patient transferred to *Solace*, thence to naval hospital, Norfolk, where he was admitted July 16 and discharged to duty July 22. This man was assigned to duty on the U. S. S. *Cæsar*, where he was surveyed July 31 for persistent headache resulting from the concussion of the exploding shell on June 22. A second survey was held September 1, and in accordance therewith he was invalided from the service by reason of chronic inflammation of right ear and persistent headache. Number of days on sick list for burns, thirty.

Case No. 9.—Seventeen larcerated wounds from shell fragments; principal injuries located as follows: One of right thigh, 3½ inches in length, below groin, extending deeply into outer muscles; one near insertion of patellar ligament, larcerating and bruising soft tissues to outer side of left tibia; one 2½ inches above left ankle down to the tendons; one of left eyelid, the iris being torn and hæmorrhage into ocular humours caused, although no external wound of eyeball produced; several trivial wounds of wrists and feet. Patient was transferred to *Solace*, thence to naval hospital, Norfolk, and later on to naval hospital, Philadelphia, where he was admitted on August 3. On admission the wounds below left knee and outer side of thigh were found unhealed and the outer quadrant of left iris detached. On September 1 wounds were recorded as healed. September 17 the detached portion of iris fixed by adhesions and the lens becoming cloudy. The cloudiness of the lens has progressed and vision has steadily failed. Patient surveyed October 10, and recommended to be invalided from the service. Number of days on sick list, one hundred and ten.

ENGAGEMENT OFF SANTIAGO, JULY 3, 1898.

U. S. S. BROOKLYN.

Case No. 1.—A chief yeoman, while determining range of the enemy on the open deck with stadimeter, had his head blown off by a large shell, only the base of the skull remaining. Death instantaneous.

Case No. 2.—Lacerated wound of right thigh; two fragments of shell entering on inner surface, passing behind the femur and making their exit externally at junction of middle and lower third of thigh. There were also superficial wounds of both legs. Aseptic dressings applied, and patent transferred to *Solace*, thence to naval hospital, Norfolk, where he was admitted July 16. Wounds healed, and on August 29 he was discharged to duty. Number of days on sick list, fifty-seven.

Case No. 3.—Rupture of right tympanic membrane from blast of an 8-inch gun. Marked inflammation of membrane, which later on subsided, the hearing having been diminished one-half. Was not admitted to sick list.

Case No. 4.—Superficial lacerated wound of left iliac region from fragment of shell. Not admitted to sick list.

Case No. 5.—Rupture of left tympanic membrane, resulting in otitis media. Not admitted to sick list at time of action, but was subsequently treated from August 6 to August 8. Number of days on sick list, two.

Case No. 6.—Rupture of tympanic membrane from blast of great gun. Not admitted to sick list at time of engagement, but was under treatment from July 28 to August 3 for resulting otitis media. Number of days on sick list, six.

Case No. 7.—Rupture of tympanic membrane from blast of 8-inch gun. Patient did not report for five days after injury, at which time there was resulting otitis media and destruction of membrane.

U. S. S. TEXAS.

Case No. 1.—Fracture of right fibula, as result of blast of great gun throwing him from gun deck to handling room through ammunition hoist. Patient transferred to naval hospital, New York, August 6, and discharged to duty September 7. Number of days on sick list, sixty-five.

Case No. 2.—Rupture of left tympanic membrane from blast of great gun. Discharged to duty same day. Number of days on sick list, one.

Case No. 3.—Rupture of left tympanic membrane and contusion of left great toe. Not admitted to sick list.

Case No. 4.—Conjunctivitis, resulting from powder burn during engagement. Discharged to duty July 5. Number of days on sick list, two.

MISCELLANEOUS ENGAGEMENTS.

U. S. S. YANKEE.

Case No. 1.—Lacerated wounds of left shoulder, caused by fragment of shell. The outer one-fifth of clavicle, the greater portion of head of humerus and inner one-third of spine of scapula carried away. Injury received June 13. There was a triangular wound over tip of left shoulder, occupying position of middle fibers of deltoid, and a ragged one over free portion of spine of scapula, communicating with the joint. Small fragments of comminuted bone filled both wound cavities, which were connected by a free incision. After removing all particles of bone and rounding off the head of the humerus with bone forceps the wound was closed and dressed aseptically. Patient was transferred to *Solace*, and thence to naval hospital, Norfolk, where he was admitted July 16. The wound healed, leaving a stiff shoulder joint, and September 24 he was invalided from the service. Number of days on sick list, one hundred and three.

U. S. S. BANCROFT.

Case No. 1.—Gunshot wound received in engagement at Cortes Bay, Cuba, on the 2d of August. The projectile entered at level of third rib on the right side just external to sternum, fracturing the rib and evidently wounding the aorta from the very great loss of blood. Death was instantaneous.

U. S. S. AMPHITRITE.

Case No. 1.—Gunshot wound of left thigh, received August 7, from bullet discharged accidentally from a revolver at a distance of 10 feet. The projectile entered the left testicle, and, continuing its course, entered the left thigh, wounding the femoral artery and vein, and embedding itself in the capsule of the hip joint. Shock was profound, and operation was delayed until patient should have rallied sufficiently to undergo the same. Traumatic gangrene having set in, amputation was deemed imperative, in spite of constitutional contraindications. The operation (performed on August 10), which lasted one hour and was attended with little loss of blood, was followed by death about three hours later. Number of days on sick list, three.

U. S. S. EAGLE.

Case No. 1.—Incised wound of left foot, received on July 12, while engaged in destroying a captured steamer. Wound extended from internal malleolus to tip of calcaneum, severing posterior tibial artery and tendo achilles. Artery ligated and tendon sutured. Patient discharged to army general hospital on July 21, at which time the wound was healing satisfactorily. The case was discharged to duty August 5. Number of days on sick list, twenty-four.

Summary of casualty report.

	Number of casualties.	Killed.	Wounded.	Died subsequently as result of wounds.	Discharged to duty.	Invalided from service.	Continued under treatment.	Total sick days for each engagement.
Action of Manila Bay (May 1)	9	......	9	......	9	......	......	88
Action off Cienfuegos (May 11)	12	1	11	1	8	1	1	492
Action off Cardenas (May 11)	8	5	3	......	3	......	......	64
Action off San Juan, Porto Rico (May 12)	8	1	7	......	5	2	......	320
Engagements at Guantanamo, Cuba (June 11 to 20)	22	6	16	......	11	2	3	1, 051
Engagement off Santiago (June 22)	10	1	9	......	7	2	......	261
Engagement off Santiago (July 3)	11	1	10	......	10	......	......	133
Miscellaneous:								
Yankee (June 13)	1	......	1	......	......	1	......	103
Eagle (July 12)	1	......	1	......	1	......	......	24
Bancroft (August 2)	1	1	......	......	......	......	......	......
Amphitrite (August 7)	1	......	1	1	......	......	......	3
Total	84	16	68	2	54	8	4	2, 539

STATISTICAL REPORT

OF THE

HEALTH OF THE NAVY AND MARINE CORPS DURING THE PERIOD OF HOSTILITIES, APRIL 21 TO AUGUST 12, 1898, INCLUSIVE.

The average strength of the Navy and Marine Corps for the 114 days of hostilities (April 21 to August 12, inclusive) was 26,102.

The total number of deaths occurring during this period was 85, of which 29 were from injuries and 56 from diseases, being at the rate of 10.40 per 1,000 per year. (Table VI.)

There were 18 persons killed in battle or died subsequently of their wounds. The number of deaths from all causes, exclusive of those killed in battle, was 67, being at the rate of 8.19 per 1,000 per year.

NORTH ATLANTIC STATION.

In the returns from the squadron operating in Cuban waters are represented 48 vessels, with an average complement of 11,599. This force furnished a total number of sick days of 19,670, affording a daily average of patients of 182.

There were 2,800 admissions for disease and 701 for injuries. The average number of days' treatment per case for injuries was 5.81, and that for diseases 5.55.

As showing the effects of war service upon the crews of the various types of ships, the monitors gave an average ratio per 1,000 of force sick daily during the war of 17.48; for 1897, 10.87; battle ships, 12.34, against 12.38 in 1897; cruisers, 17.01, as against 17.31 for 1897; gunboats, 15.74, as against 20.14 for 1897.

As regards heat prostration on the various types of vessels, the monitors furnished 20 cases, with 38 sick days, a rate of 25.80 per 1,000 for cases and 49.03 for sick days; the battle ships, 71 cases, with 210 sick days, a rate per 1,000 of 27.36 for cases and 80.92 for sick days; the cruisers gave 42 cases and 135 sick days, a rate of 12.75 per 1,000 for cases and 41 per 1,000 for sick days; the gunboats furnished 17 cases and 54 sick days, the rate per 1,000 being 8.90 and 28.28, respectively.

Of the diseases especially incident to operations in a tropical climate, there were 226 cases of malarial diseases, giving a total number of sick days of 1,105. There were 18 cases of dysentery, with 107 sick days. One hundred and eighty-one cases of heat stroke were under treatment for 629 days. Diarrhœal affections furnished 292 admissions and 1,120 sick days.

There were 310 admissions for injuries, with 4,120 sick days.

Of the 3,501 admissions only 12 were for typhoid fever.

ASIATIC STATION.

The health of the squadron operating in Asiatic waters during that period of the war extending from April 21 to June 30, inclusive, varied but little from that for 1897, the ratio per 1,000 of force sick daily being less on the *Olympia* for this period than for 1897, and slightly in excess as regards the other vessels of the squadron.

Of those affections peculiarly incident to war operations in a tropical country, there occurred 44 cases of malarial diseases, total sick days 343; 20 of heat stroke, total sick days 73; 38 of diarrhœal affections, sick days 118; and 3 cases of dysentery, with 21 sick days.

There were 52 admissions for injuries, with 399 sick days.

One death occurred on the *Boston* from acute dysentery.

During the progress of the battle of Manila Bay there were 6 cases of heat stroke, distributed among the vessels of the fleet as follows: *Baltimore*, 1; *Boston*, 2; *Concord*, 1; *Raleigh*, 2. These 6 cases gave a total of 7 sick days.

MARINE BATTALION, NORTH ATLANTIC FLEET.

The average strength of the marine battalion April 21 to August 12, inclusive, was 588—21 officers and 567 men.

During the period of hostilities this force served 36 days on board a transport, being at sea about 10 days of the time. On June 10 a landing was made at Guantanamo, Cuba, where the battalion was in camp for the remainder of the war.

The daily average of patients was 13.14, and the rate per 1,000 of force sick daily 22.34.

There were 6 deaths, all of which occurred in the engagements with the Spanish troops, not a single fatal case occurring from disease.

Of general infectious diseases, there were 7 cases of dysentery, 19 of malarial diseases, 3 of pneumonia, and 12 of measles.

During the entire period of hostilities there was not a case of typhoid fever.

An interesting fact in connection with the health record of this force is that for the 39 days intervening between the signing of the protocol and the disbanding of the battalion there were only 14 admissions to the sick list, with a total of 115 sick days, affording as the daily average of patients 2.94, and the ratio per 1,000 of force sick daily 5.

None of these cases were invalided to hospital or from service, all having been discharged to duty.

STATISTICAL TABLES.

The following statistical tables give in detail the data obtained from the reports of patients treated on board those vessels of the Navy actively engaged in the operations of war, and thereby subjected to conditions calculated to have an unfavorable effect upon the health of the persons serving thereon.

In several minor instances these returns have not yet been received, and as a consequence the facts as to admissions and dispositions refer only to those vessels included in Tables I and III; but Table VI embraces *all* deaths occurring in the Navy and Marine Corps during the entire period of hostilities.

The information relating to the health statistics of the ships of the Asiatic Station is derived from reports covering the period April 21 to June 30, inclusive, the returns of the last forty-three days of the war not having been received as yet.

I. North Atlantic Station: Names of vessels, period of war service, average complements, admissions for disease and injury, sick days, daily average of patients for war and 1897, ratio per 1,000 of force sick daily for war and 1897, and disposition of cases.

II. North Atlantic Station: Detailed statement.

III. Asiatic Station: Names of vessels, period of war service, average complements, admissions for disease and injury, sick days, daily average of patients for war and 1897, ratio per 1,000 of force sick daily for war and 1897, and disposition of cases.

IV. Asiatic Station: Detailed statement.

V. Detailed statement of health of Marine battalion, North Atlantic fleet.

VI. Mortuary record, embracing all deaths occurring in the Navy and Marine Corps during period of hostilities, giving causes of death and places of occurrence.

TABLE I.—*North Atlantic Station.—Period of service, average complements, admissions for disease and injury, sick days, daily average of patients, discharges to duty, transfers to hospital, discharges from the service, cases continued subsequent to August 12, and deaths on each ship for the period of hostilities, April 21 to August 12, inclusive.*

Names of ships.	Period of service (days).	Average complement.	Admissions.			Number of sick days.	Daily average of patients.	Daily average of patients, 1897.	Ratio per 1,000 of force sick daily.	Ratio per 1,000 of force sick daily, 1897.	Number discharged to duty.	Number discharged to hospital.	Number invalided from the service.	Number of deaths.	Number continued.
			Disease.	Injury.	Total.										
Amphitrite	114	200	77	20	97	374	3.28	1.21	16.00	11.00	76	16	0	2	3
Annapolis	114	139	29	10	39	325	2.85	2.29	20.50	16.22	33	4	0	0	2
Badger	110	252	27	1	28	167	1.51	.....	5.99	......	23	2	0	0	3
Bancroft	114	143	43	7	50	246	2.15	2.78	15.03	23.97	38	9	0	1	2
Brooklyn	114	552	110	41	151	988	8.66	9.66	15.68	20.00	130	7	0	2	12
Castine	114	146	25	13	38	459	4.02	4.47	27.53	31.48	31	4	0	0	3
Celtic	78	123	48	13	61	227	2.91	.....	23.65	......	45	13	0	0	3
Columbia	114	450	90	23	113	603	5.28	1.72	11.73	8.43	85	22	0	0	6
Detroit	114	252	35	4	39	228	2.00	3.95	7.93	19.17	29	3	0	0	7
Dolphin	114	125	22	10	32	166	1.45	1.79	11.60	17.05	25	5	0	0	2
Eagle	114	64	11	7	18	92	0.81	.....	12.50	......	15	1	0	0	2
Fern	114	54	15	6	21	119	1.04	0.47	19.25	10.22	18	3	0	0	0
Helena	114	183	35	1	36	95	0.83	2.69	4.53	15.65	34	1	0	1	0
Indiana	114	571	123	47	170	928	8.14	6.41	14.25	14.47	147	13	3	0	7
Iowa	114	587	102	26	128	702	6.15	5.46	10.47	11.77	107	16	0	0	5
Katahdin	114	101	40	11	51	176	1.54	0.81	15.24	10.25	29	18	0	0	4
Lancaster	100	565	101	38	139	685	6.85	5.78	12.12	24.49	78	41	17	1	2
Lebanon	114	63	10	3	13	43	0.37	.....	5.87	......	8	5	0	0	0
Machias	114	158	39	9	48	304	2.66	4.36	16.83	30.92	33	13	0	0	2
Marblehead	114	267	70	31	101	669	5.86	4.96	21.94	23.63	82	11	0	1	7

TABLE I.—*North Atlantic Station.—Period of service, average complements, etc.*—Cont'd.

Names of ships.	Period of service (days).	Average complement.	Admissions.			Number of sick days.	Daily average of patients.	Daily average of patients, 1897.	Ratio per 1,000 of force sick daily.	Ratio per 1,000 of force sick daily, 1897.	Number discharged to duty.	Number discharged to hospital.	Number invalided from the service.	Number of deaths.	Number continued.
			Disease.	Injury.	Total.										
Marietta	114	144	55	2	57	380	3.33	.....	23.12	......	53	2	0	0	2
Massachusetts	114	480	121	31	152	765	6.71	5.13	13.97	11.45	133	8	0	1	10
Mayflower	114	171	24	13	37	398	3.49	.....	20.40	......	31	2	0	0	4
Miantonomoh	114	175	57	12	69	370	3.24	.....	18.51	......	62	5	2	0	0
Minneapolis	114	427	88	35	123	658	5.77	3.68	13.51	12.43	92	14	3	0	14
Montgomery	114	281	114	7	121	772	6.77	3.23	24.09	13.40	110	6	0	0	5
Nashville	114	179	39	13	52	283	2.48	1.38	13.85	8.57	46	3	0	0	3
New Orleans	114	411	135	24	159	572	5.01	.....	12.18	......	140	17	0	0	2
Newport	114	142	34	7	41	237	2.07	1.85	14.57	14.23	26	14	0	1	0
New York	114	652	189	37	226	1,647	14.44	6.97	22.14	13.03	168	24	0	2	32
Oregon	114	524	81	21	102	685	6.00	4.44	11.45	10.11	80	15	0	1	6
Panther	114	141	44	2	46	226	1.98	.....	14.04	......	42	4	0	0	0
Peoria	91	50	11	2	13	54	0.59	.....	11.80	......	12	1	1	0	0
Prairie	97	251	42	10	52	171	1.76	.....	7.01	......	38	12	0	0	2
Princeton	78	138	30	6	36	103	1.32	.....	9.56	......	23	11	0	0	2
Puritan	114	233	76	20	96	533	4.67	1.56	20.04	8.00	71	18	2	0	5
San Francisco	114	372	142	24	166	815	7.14	8.96	19.19	24.41	118	42	0	1	5
Scindia	84	108	38	4	42	118	1.40	.....	12.96	......	38	2	0	0	2
Southery	103	52	14	5	19	45	0.43	.....	8.26	......	13	4	0	0	2
Supply	101	77	34	5	39	181	1.79	.....	23.24	......	33	0	0	0	6
Terror	114	167	39	14	53	313	2.74	2.07	16.40	13.62	35	9	1	0	8
Texas	114	433	71	45	116	572	5.02	5.21	11.59	14.12	85	30	0	1	0
Topeka	59	197	33	5	38	176	2.98	.....	5.32	......	30	4	0	0	4
Vesuvius	114	78	9	7	16	90	0.78	0.91	10.00	14.00	12	2	0	0	2
Vicksburg	114	139	10	4	14	178	1.56	0.66	11.22	6.29	5	8	0	1	0
Wilmington	114	177	41	8	49	265	2.32	3.83	13.10	20.52	38	4	0	0	7
Yankton	89	83	14	4	18	65	0.73	.....	8.79	......	17	0	0	0	1
Yosemite	98	322	163	13	176	702	7.16	.....	22.23	......	160	8	1	0	7
Total	....	11,599	2,800	701	3,501	19,670	.....	.....	......	......	2,777	476	29	16	203

TABLE II.—*North Atlantic Station.—Detailed Statement.*

Diseases.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued Aug. 12.
			To hospital.	From service.		
CLASS I.						
Parasites and parasitic diseases.						
Scabies	2	1	1			
Tænia	2	2				
Tinea trichophytina	3	3				
CLASS II.						
General infectious diseases (nonvenereal).						
Cachexia malarialis	14	5	8		1	
Catarrhus epidemicus	218	202	13	1		2
Cholera morbus	9	6	2			1
Diphtheria	1		1			
Dysenteria acuta	17	11	5			1
Dysenteria chronica	1		1			
Erysipelas	6	5				1
Febris enterica	12	2	10			
Febris intermittens	138	118	12			8
Febris pneumonica	11	1	9	1		
Febris remittens	74	47	15			12
Morbilli	19	6	11			2
Parotitis epidemica	1	1				
Rheumatismus articularis acutus	47	25	16			6
Rheumatismus articularis chronicus	10	1	8			1
Rubella	7	7				
Tuberculosis pneumonica acuta	8		7	1		
Tuberculosis pneumonica chronica	10	1	9			
Vaccina	29	27				2
CLASS III.						
Constitutional disorders of nutrition.						
Anæmia	18	9	5	3		1
Debilitas senilis	2		1			1
Diabetes mellitus	2		2			
Leucocythæmia	1		1			
Lithæmia	3		3			
Purpura hæmorrhagica	1		1			
CLASS IV.						
Diseases of the nervous system.						
Apoplexia	2				2	
Atrophia muscularis progressiva	1		1			
Cephalalgia	24	23	1			
Dementia	1	1				
Epilepsia	12	3	6	3		
Febris continua simplex	51	46	2			3
Febris ephemera	118	110				8
Febris thermica	22	19	2			1
Hemicrania	2	1	1			
Mania	3	1	2			
Melancholia	6	1	4			1
Meningitis	2		2			
Monoplegia	2	2				
Nausea marina	20	15	4	1		
Neuralgia	34	32	1			1
Neurasthenia	20	5	12	1		2
Neuritis	1	1				
Neuritis multiplex	1	1				
Neurosis hysteroidea	2		2			
Paranoia	2		2			
Prostratio thermica	169	162	3	1		3
Sciatica	12	9	2			1
Torticollis spasmodica	1	1				
Vertigo	16	12	3			1
CLASS V.						
Diseases of the visual apparatus.						
Amblyopia	1		1			
Asthenopia	2		1			1
Conjunctivitis	22	21				1
Corneæ ulcus	2	1	1			
Iritis	3	1	2			
Retinitis	2	1	1			

TABLE II.—*North Atlantic Station.—Detailed Statement*—Continued.

Diseases.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued Aug. 12.
			To hospital.	From service.		
CLASS VI.						
Diseases of the auditory apparatus.						
Otalgia	4	4				
Otitis externa	7	7				
Otitis media	26	22	3			1
Surditas	1		1			
CLASS VII.						
Diseases of the olfactory apparatus.						
Antri abscessus	1		1			
Rhinitis acuta	7	7				
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.						
Subsidiary Class 1.—Diseases of the digestive apparatus.						
Ani prolapsio	1					1
Ani rhagades	2		2			
Appendicitis	8	1	7			
Catarrhus gastricus acutus	32	27	3			2
Catarrhus gastricus chronicus	7	4	2	1		
Catarrhus intestinalis acutus	60	44	6			10
Catarrhus intestinalis chronicus	4	1	3			
Cholelithiasis	3	1	2			
Colica	60	57	1			2
Constipatio	20	18	1			1
Diarrhœa simplex	228	206	2			20
Dyspepsia nervosa	3	1	2			
Fistula in ano	3	1	2			
Gastralgia	1	1				
Hæmorrhois	22	15	5			2
Hepatis congestio	32	27	1			4
Hepatitis suppurativa	2		2			
Icterus	5	3	2			
Odontalgia	3	2	1			
Periodontitis	5	5				
Periproctitis	2	1	1			
Pharyngitis	22	20	2			
Tonsillitis	103	98	2			3
Subsidiary Class 2.—Diseases of the circulatory apparatus.						
Blood vessels:						
Aneurysma	1		1			
Angina pectoris	1		1			
Arteriosclerosis	3		3			
Cordis hypertrophia	1	1				
Cordis palpitatio	12	5	6			1
Cordis valvularum morbus	5		4	1		
Pericarditis	1			1		
Phlebitis	2	1	1			
Varix	2		1			1
Lymphatics:						
Lymphadenitis	17	12	3			2
Lymphangitis	1	1				
Subsidiary Class 3.—Diseases of the respiratory apparatus.						
Asthma	3	2		1		
Bronchopneumonitis	2		1		1	
Bronchitis acuta	153	141	10			2
Bronchitis chronica	9	3	4			2
Catarrhus bronchialis	33	31				2
Hæmoptysis	1		1			
Laryngitis acuta	8	8				
Laryngitis chronica	1	1				
Pleuritis acuta	7	1	4			2
Pleuritis chronica	3	1	2			

TABLE II.—*North Attantic Station.—Detailed Statement*—Continued.

Diseases.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued Aug. 12.
			To hospital.	From service.		
CLASS IX.						
Diseases of the motory apparatus.						
Arthritis	4	1	3			
Bursitis	5	5				
Myalgia acuta	117	105	7			5
Myalgia chronica	6	4	2			
Periostitis	4	4				
Synovitis	19	13	5			1
Thecitis	2	1	1			
CLASS X.						
Diseases of the cutaneous apparatus.						
Abscessus	116	97	5			14
Acne	1	1				
Carbunculus	2	2				
Cellulitis	8	5	2			1
Clavus	1	1				
Cutis fissuræ	1	1				
Eczema	7	5				2
Erythema	11	10				1
Furunculus	60	57				3
Herpes simplex	2	2				
Impetigo	1	1				
Lichen	7	7				
Paronychia	8	5				3
Pemphigus	19	17	1			1
Ulcus	19	13	4			2
Unguis involutus	2	1				1
Urticaria	2	2				
Verruca	1		1			
CLASS XI.						
Venereal diseases and diseases of the genito-urinary apparatus.						
Adenitis inguinalis (venereal)	23	11	10			2
Arthritis gonorrhoica	3	2	1			
Chancroid	9	4	4			1
Cystitis	10	9	1			
Enuresis	1	1				
Epididymitis	16	10	4			2
Gonorrhœa	25	15	9	1		
Hæmaturia	1		1			
Hydrocele	1	1				
Nephritis chronica	7		3	1		3
Orchitis	17	14	3			
Paraphimosis	1	1				
Phimosis	2	2				
Syphilis consecutiva	43	18	21	2		2
Syphilis primitiva	7	5	1	1		
Urethræ strictura	7	3	4			
Urina suppressa	1	1				
Varicocele	2		2			
CLASS XII.						
Cysts and new growths.						
Chondroma	1		1			
Epithelioma	2	1	1			
Sarcoma	2	1	1			
CLASS XIII.						
Injuries.						
Abrasio	8	8				
Ambustio ex calore	59	48	5			6
Asphyxia	1					1
Asphyxia ex submersione	3				3	
Concussio	2	1	1			
Contusio	186	171	8	1		6
Fractura	40	23	11	3		3

TABLE II.—*North Atlantic Station.—Detailed Statement*—Continued.

Diseases.	Admitted.	Discharged to duty.	Invalided. To hospital.	Invalided. From service.	Died.	Continued Aug. 12.
CLASS XIII—continued.						
Injuries—Continued.						
Fulminis ictus	1	1	....	....	....	....
Hernia	31	1	26	2	....	2
Luxatio	4	3	1	....	....	....
Membranæ tympani ruptio	10	9	1	....	....	....
Sole excoctus	7	7	....	....	....	....
Stremma	101	88	5	2	....	6
Vulnus contusum	73	70	....	....	....	3
Vulnus incisum	50	43	5	....	....	2
Vulnus laceratum	75	61	5	....	1	8
Vulnus punctum	24	21	2	....	....	1
Vulnus sclopeticum	38	15	15	....	8	....
CLASS XV.						
Poisons.						
Alcoholismus	8	8	....	....	....	....
Venenum neuroticum	1	....	....	....	....	1
Vulnus venenatum	11	10	....	....	....	1
Total	3,501	2,777	476	29	16	203

TABLE III.—*Asiatic Station—Period of service, average complements, admissions for disease and injury, sick days, daily average of patients, discharges to duty, transfers to hospital, discharges from the service, cases continued subsequent to June 30, and deaths on each ship for the period of hostilities, April 21 to June 30, inclusive.*

Names of ships.	Period of service (days).	Average complement.	Admissions. Disease.	Admissions. Injury.	Admissions. Total.	Number of sick days.	Daily average of patients.	Daily average of patients, 1897.	Ratio per 1,000 of force sick daily.	Ratio per 1,000 of force sick daily, 1897.	Number discharged to duty.	Number discharged to hospital.	Number invalided from the service.	Number of deaths.	Number continued.
Baltimore	71	402	17	11	28	292	4. 11	3. 93	10. 22	10. 03	23	2	0	0	3
Boston	71	274	66	8	74	560	7. 88	8. 20	28. 75	22. 53	71	0	0	1	2
Concord	71	187	47	15	62	393	5. 53	3. 36	29. 57	19. 89	57	0	0	0	5
Olympia	71	454	28	4	32	402	5. 66	6. 20	12. 46	13. 87	28	0	0	0	4
Petrel	71	129	32	4	36	303	4. 26	3. 29	33. 02	25. 50	35	1	0	0	0
Raleigh	71	297	56	10	66	437	6. 15	6. 31	20. 70	18. 45	60	0	0	0	6
Total	.....	1,743	246	52	298	2,387	......	......	......	....	274	3	0	1	20

TABLE IV.—*Asiatic Station.—Detailed Statement.*

Diseases.	Admitted.	Discharged to duty.	Invalided.		Died.	Continued June 30.
			To hospital.	From service.		
CLASS II.						
General infectious diseases (nonvenereal).						
Cholera morbus	1	1				
Dysenteria acuta	3	2			1	
Febris enterica	1					1
Febris intermittens	6	6				
Febris remittens	37	34				3
Morbilli	1	1				
Rheumatismus articularis acutus	5	3	2			
Tuberculosis pneumonica acuta	1					1
CLASS IV.						
Diseases of the nervous system.						
Epilepsia	1	1				
Febris continua simplex	2	2				
Febris ephemera	3	3				
Febris thermica	1	1				
Neuralgia	1	1				
Neurasthenia	1	1				
Prostratio thermica	19	19				
Sciatica	1	1				
CLASS V.						
Diseases of the visual apparatus.						
Amaurosis	1					1
Conjunctivitis	1	1				
Iritis	1	1				
CLASS VI.						
Diseases of the auditory apparatus.						
Otitis media	3	3				
Surditas	2	2				
CLASS VII.						
Diseases of the olfactory apparatus.						
Rhinitis acuta	3	3				
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.						
Subsidiary Class 1.—Diseases of the digestive apparatus.						
Appendicitis	1	1				
Catarrhus gastricus acutus	6	6				
Catarrhus intestinalis acutus	23	23				
Catarrhus intestinalis chronicus	1					1
Cholelithiasis	1	1				
Colica	2	2				
Diarrhœa simplex	13	13				
Dyspepsia nervosa	1	1				
Fistula in ano	1	1				
Gastralgia	1	1				
Hæmorrhois	3	2				1
Hepatis congestio	1					1
Icterus	1	1				
Tonsillitis	9	9				
Subsidiary Class 3.—Diseases of the respiratory apparatus.						
Bronchitis acuta	2	2				
Catarrhus bronchialis	1	1				
Laryngitis acuta	1	1				
Pleuritis acuta	1	1				

TABLE IV.—*Asiatic Station.—Detailed Statement*—Continued.

Diseases.	Ad-mitted.	Dis-charged to duty.	Invalided.		Died.	Con-tinued June 30.
			To hos-pital.	From service.		
CLASS IX.						
Diseases of the motory apparatus.						
Myalgia acuta	5	5				
Periostitis	2	1				1
CLASS X.						
Diseases of the cutaneous apparatus.						
Abscessus	7	6				1
Cellulitis	1	1				
Furunculus	5	5				
Onychia	1	1				
Paronychia	1	1				
Pemphigus	1	1				
Ulcus	2	1				1
CLASS XI.						
Venereal diseases and diseases of the genito-urinary apparatus.						
Adenitis inguinalis (venereal)	16	16				
Arthritis gonorrhoica	2	1				1
Cystitis	3	3				
Epididymitis	5	4				1
Orchitis	7	7				
Paraphimosis	3	3				
Phimosis	2	2				
Prostatitis	1					1
Syphilis consecutiva	11	11				
Syphilis primitiva	5	4				1
Urethræ strictura	1	1				
CLASS XIII.						
Injuries.						
Abrasio	3	3				
Ambustio ex calore	6	6				
Contusio	6	5				1
Fractura	4	3				1
Hernia	2	2				
Membranæ tympani ruptio	5	5				
Stremma	9	8	1			
Vulnus contusum	8	7				1
Vulnus incisum	3	2				1
Vulnus laceratum	2	2				
Vulnus punctum	2	2				
Vulnus sclopeticum	2	2				
CLASS XV.						
Poisons.						
Dermatitis venenata	1	1				
Total	298	274	3		1	20

TABLE V.—*United States Marine Battalion, North Atlantic Fleet.—Detailed Statement.*

Diseases.	Admitted.	Discharged to duty.	To hospital.	Died.	Continued August 12.	Total number of sick days.
CLASS I.						
Parasites and parasitic diseases.						
Tinea trichophytina	1	1				3
CLASS II.						
General infectious diseases (nonvenereal).						
Catarrhus epidemicus	37	37				81
Dysenteria acuta	7	6			1	69
Febris intermittens	18	15	1		2	167
Febris pneumonica	3	3				102
Febris remittens	1	1				7
Morbilli	12	11	1			236
Rheumatismus articularis acutus	3	1	2			65
Tuberculosis pneumonica chronica	1		1			22
Vaccina	1	1				3
CLASS IV.						
Diseases of the nervous system.						
Febris continua simplex	6	5	1			31
Melancholia	3		3			6
Neurasthenia	3	1	2			12
Neurosis hysteroidea	1		1			3
Prostratio thermica	2	2				3
CLASS V.						
Diseases of the visual apparatus.						
Conjunctivitis	1	1				3
Iritis	1	1				7
CLASS VI.						
Diseases of the auditory apparatus.						
Otitis media	1		1			1
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.						
Subsidiary Class I.—Diseases of the digestive apparatus.						
Catarrhus gastricus acutus	1	1				5
Catarrhus gastricus chronicus	1		1			1
Catarrhus intestinalis acutus	1		1			2
Diarrhœa simplex	7	4	1		2	59
Hæmorrhois	1	1				5
Icterus	1		1			23
Subsidiary Class II.—Diseases of the circulatory apparatus.						
Lymphadenitis	2	1	1			30
CLASS IX.						
Diseases of the motory apparatus.						
Synovitis	1		1			16
Thecitis	1	1				23
CLASS X.						
Diseases of the cutaneous apparatus.						
Abscessus	6	4	2			38
Ecthyma	1	1				38
Furunculus	2	2				17
Herpes zoster	1	1				19
Lichen	2	2				18

TABLE V.—*U. S. Marine Battalion, North Atlantic Fleet.—Detailed Statement*—Cont'd.

Diseases.	Admitted.	Discharged to duty.	To hospital.	Died.	Continued August 12.	Total number of sick days.
CLASS XI.						
Venereal diseases and diseases of the genito-urinary apparatus.						
Adenitis inguinalis (venereal)	2		2			38
Chancroid	1	1				21
Cystitis	1		1			22
Epididymitis	1	1				21
Gonorrhœa	2	2				2
Syphilis consecutiva	3	3				6
CLASS XII.						
Cysts and new growths.						
Cystis	1	1				8
Lipoma	1	1				6
CLASS XIII.						
Injuries.						
Contusio	6	6				33
Fractura	2		1	1		34
Hernia	2		2			5
Luxatio	1	1				18
Sole excoctus	8	8				33
Stremma	4	3			1	31
Vulnus incisum	4	3	1			21
Vulnus laceratum	5	5				33
Vulnus punctum	1	1				2
Vulnus sclopeticum	20	2	13	5		42
CLASS XV.						
Poisons.						
Dermatitis venenata	1	1				6
Vulnus venenatum	1	1				3
Total	197	144	41	6	6	1,500

TABLE VI.—*Mortuary record of the Navy and Marine Corps during period of hostilities.*

Causes of death. *a*	Number of deaths.						
	Naval hospitals.	Hospitals other than naval.	Ships—North Atlantic Squadron.	Ships—Asiatic Squadron.	Marine Battalion.	Vessels elsewhere and shore stations.	Total.
Appendicitis	2	2				1	5
Apoplexia	1		3				4
Asphyxia ex submersione			4	1		1	6
Abscessus cerebri	1						1
Alcoholismus			1				1
Aneurysma	1					1	2
Bronchopneumonitis			1			1	2
Carcinoma	2		1				3
Cordis valvularum morbus	1						1
Catarrhus intestinalis chronicus	1						1
Cachexia malarialis			1				1
Diphtheria	1						1
Dysenteria acuta			1	1			2
Febris pneumonica	5		1				6
Febris remittens		1	1				2
Febris enterica	3	1					4
Fractura (cervical vertebræ)					1		1
Hepatitis chronica				1			1
Meningitis	3	2				1	6
Nephritis chronica	2						2
Obstructio intestinalis		1					1
Septicæmia	2						2
Sclerosis multiplex	1						1
Tuberculosis pneumonica acuta	2						2
Tuberculosis pneumonica chronica	4			1			5
Vulnus sclopeticum		1	16		5		22
Total	32	8	30	4	6	5	85

a Only thirteen cases of typhoid fever occurred on the vessels included in Tables I and III. They furnished 1 death, and that occurred in hospital. The cases of dysentery and diarrhœal affections on the same vessels furnished only 1 death. Of the 40 deaths reported from hospitals only 6 occurred among those transferred from the vessels mentioned—1 each from gunshot wound, appendicitis, typhoid fever, pneumonia, meningitis, and diphtheria.

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REPORT

OF THE

SURGEON-GENERAL, U. S. NAVY,

CHIEF OF THE BUREAU OF MEDICINE AND SURGERY,

TO THE

SECRETARY OF THE NAVY.

1899.

WASHINGTON:
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REPORT

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SURGEON-GENERAL, U. S. NAVY.

NAVY DEPARTMENT,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., October 1, 1899.

SIR: In obedience to instructions contained in Department's letter of July 11, 1899, I have the honor to report the operations of this Bureau for the past year, accompanied by a set of annual estimates for the fiscal year ending June 30, 1901, and a statistical report showing the health of the Navy for the year 1898. The report embraces a statement of the condition of the naval hospital fund, the naval medical establishment, and other matters of interest pertaining to the duties of the Bureau of Medicine and Surgery.

A review for the past year of the various measures relating to the management of the medical establishment, and of all other matters coming under the general and immediate control of this Bureau, shows a satisfactory record in the administration of this department of the naval service and affords gratifying evidence of continued professional and executive efficiency in all work, the responsibility for which, in a greater or less degree, devolved upon the medical officers of the Navy.

As soon as peace was declared, the Medical Department of the Navy commenced to reduce expenses, and to place itself on a peace basis. There had been no unnecessary accumulation of stores or material, and it had nothing to condemn, sell, or destroy. Everything purchased for war has since been utilized. Of the $100,000 appropriated by Congress for this Bureau, for war purposes, $37,000 has been returned to the Treasury. The ambulance ship *Solace*, that rendered such effective service during the war, is now used partly as a transport, but furnishes excellent accommodations for the sick in their transfer from the fleet at Manila to the naval hospital at Yokohama or Mare Island. Those invalids requiring mainly change of climate and rest for recuperation are disembarked at Yokohama and soon return to their proper station for duty, while the more severe cases, and those unfit for service, are transferred to the naval hospital at Mare Island for further treatment or discharge from the service.

The rehabilitation and renovation of all naval hospitals, which was inaugurated several years ago by the Bureau, has been steadily continued. The ward capacity in many of them has been increased, and in several of the hospitals the number of beds has been more than doubled. The necessity for this large increase in hospital accommodations for the care and treatment of the sick and wounded of the Navy is readily understood when we consider the several enactments made by Congress during the past few years, in which liberal provision is made for the progressive increase in the personnel and material of the naval establishment.

To meet the extra demands made upon the Navy by the acquisition and establishment of navy-yards and naval stations in several of the harbors of our new possessions, and to fit them out with a suitable equipment, it became necessary for the medical department of the Navy, in order to anticipate the requirements of the service, to make preparations and provide ample accommodations for the treatment of our officers and men who were detailed for duty in our several foreign possessions. Such action, moreover, was imperatively necessary in the Philippine Islands, where, owing to the assembling of a large fleet of vessels, and the further fact that these islands are situated well within the tropics, it was only reasonable to anticipate that much sickness would prevail and that the establishment of a hospital at Manila was indispensable to the efficiency of the fleet and to the welfare of the patients. A naval hospital with the necessary furniture, instruments, etc., and a complete administrative outfit, has been organized and placed in commission at Cavite, Philippine Islands, and the building occupied for this purpose is so arranged and constructed that it can be enlarged and its capacity doubled whenever the interests of the service may require it.

The U. S. S. *Yosemite*, before leaving the United States, was fitted out with medical supplies, instruments, and furniture for the establishment of a small hospital at Guam, Ladrone Islands, should the requirements of the service make it necessary. At the naval stations, Havana, Cuba, and San Juan, Porto Rico, small buildings have been procured for hospital purposes and have been properly fitted up for the reception of naval patients whose illness may be of a temporary character and who can be comfortably cared for in these establishments until in a suitable condition to be transferred north to a naval hospital.

Medical Corps of the Navy.—The steady increase in the enlisted force of the Navy that has taken place during the past two years, and also the passage of the personnel bill, which has added more than 3,000 officers and men to the strength of the Marine Corps, calls attention very forcibly to the necessity for Congressional action, in which suitable provision should be made for an enlargement in the number of officers in the Medical Corps of the Navy.

The reasonableness for such proposed action should appeal strongly to all who are interested in the welfare of the Navy, and particularly to those entrusted with legislative functions and upon whom the responsibility rests for maintaining the present and future efficiency of this branch of the naval establishment. The number of medical officers, now allowed by law, is far below the number required for the diversified duties which they are called upon to perform, and it is earnestly hoped that proper provision will be made by Congress, during its coming session, to remedy a condition which is detrimental to the efficiency of the corps, to the interests of the service, and, indirectly, to the country at large. It is impossible to meet the requirements of the service with the present number of medical officers. Every one who is not sick is on duty, and the Bureau has been unable to supply officers for needed recruiting and other duty. I have the honor, therefore, to request that your approval may be given to proposed legislation for a small increase in the lower grades of the corps. It is recommended that the corps be increased 5 surgeons and 20 assistant surgeons, and that the volunteer assistant surgeons, who served during the war with Spain and who are now in service, be transferred to the regular naval service and included in the number of assistant surgeons allowed, and that in their cases the present legal limit of age on admission be waived. There are now 18 in the service and many of them are desirous of entering the regular service but are over 30 years of age, which is the limit prescribed by law for admission. The addition of 5 surgeons will give promotion, without however any increase of rank or pay, to 5 of the senior passed assistant surgeons who have been over ten years in the service. It is also earnestly requested that provision be made in the same act for placing assistant surgeons in the Navy on an equality with assistant surgeons in the Army in regard to rank and pay. At present they are lower in rank and receive less pay, with the inevitable sequence, the Army can get all the candidates they need, and the Navy can get scarcely any. Qualified medical men who wish to enter Government service naturally go where they can get the best rank and the best pay, and that service unfortunately is not the naval service. There are now 4 vacancies for assistant surgeons and there will probably be 8 additional from retirements during the next year, and it is the earnest hope of the members of the corps who are proud of its history and of its achievements that it will not die out from lack of recruits.

United States naval hospital corps.—The wisdom of Congress in making suitable provision for the better care and treatment of the sick ashore and afloat by the passage of the bill establishing a hospital corps for the Navy has been fully demonstrated, and during the short time that the organization has been in existence it has proved its usefulness and efficiency. All of the naval hospitals are now supplied with trained nurses, and hospital apprentices, when enlisted are sent to a naval hospital, where they are thoroughly instructed in all that pertains to their duties before they are sent to sea.

The officers in charge of the United States Naval Laboratory, Brooklyn, N. Y., and the medical storehouse, Mare Island, Cal., have performed their duties satisfactorily and efficiently, filling all requisitions promptly, and meeting every demand made upon them during the past year. A small one-story fireproof brick building has been recently constructed adjoining the naval laboratory, which will hereafter be utilized as a storehouse for all liquors and for all medicines of an inflammable or combustible nature.

After much care and deliberation in its preparation, and with the view of meeting the requirements of the service, a new supply table, intended for the use of all ships and shore stations, has been issued by the Bureau. Improvements have been made in the outfits of surgical instruments recently issued, and all of the larger naval hospitals have been furnished with surgical cabinet cases. The installation in each of the naval hospitals of an X-ray apparatus, to which attention was called in one of the Bureau's former reports, has been attended with most satisfactory results and has contributed largely to accuracy in diagnosis, and has proved of great value in the prognosis and treatment of difficult surgical cases.

An examination of the professional work of medical officers ashore and afloat exhibits care and accuracy in the preparation of all official papers, and a commendable zeal in the performance of their duties.

NAVAL HOSPITAL FUND.

The condition of this fund is as follows:

Balance on hand July 1, 1898	$185, 932. 27
Transferred to the credit since July 1, 1898	90, 983. 54
Credit by appropriation for fiscal year 1899	20, 000. 00
	296, 915. 81
Expended since July 1, 1898	161, 698. 17
Balance on hand June 30, 1899	135, 217. 64

ESTIMATES.

In addition to the sums annually appropriated by Congress, estimates have been submitted for the following work:

Naval hospital, New York.—"For removing old boilers condemned as worn out and worthless, and furnishing and installing two new water-tube boilers at the naval hospital, New York, $5,000."

The old boilers have been in use for many years. They have been repaired and patched until they are now beyond repair. They have been surveyed under the direction of the Chief of the Bureau of Steam Engineering, who condemns them as unfit for further repairs.

Naval hospital, Mare Island, Cal.—"For new boiler house, boilers, and equipment for naval hospital, Mare Island, Cal., $10,000."

The present boiler house is an old building, out of repair. It was originally placed in a ravine below the hospital, and the drainage was through the tules to the river. The tules, having been recently filled by dredging from the river, has made the site of the boiler house lower than the adjacent land. The cost of a new boiler house would be but little more than the cost of repairs to the old building and the building of new sewers and installing a new pumping system to lift the drainage to a higher level. The boilers are old and worn out and can not be further repaired.

Naval hospital, Newport, R. I.—"For an addition to the naval hospital at the naval training station, Newport, R. I., $20,000.

This addition is rendered absolutely necessary in order to accommodate the sick of a largely increased number of apprentice boys at the station. One hundred and twenty-five thousand dollars was appropriated at the last session of Congress for additional barracks, and these will soon be ready for occupancy, and the number of apprentices will be doubled. The present hospital only accommodates 24, and it has often been filled. It will be simply impossible to afford proper hospital accommodations to the sick apprentices with the present hospital building after an additional number of boys occupy the new barracks.

GENERAL REPAIRS AT NAVAL HOSPITALS.

Naval hospital, Widows Island, Maine.—No work, except such minor repairs as was deemed necessary for the preservation of the building, has been done at this hospital during the past year. The Bureau has recently authorized certain repairs in connection with the rebuilding of the wharf, taking off the top as far as the stringers and putting in new girders. As the Department has had no occasion to use this hospital in the past, and as there is slight probability that such necessity will arise in the future, only such repairs will be made as may be necessary to preserve the building from deterioration and until such time as the hospital grounds and building can be satisfactorily disposed of by the Government.

Naval hospital, Portsmouth, N. H.—Many improvements and repairs have been made at this hospital during the past year. The frame stable, the construction of which was referred to in the Bureau's last annual report, has been completed and is now occupied. The stable cellar has been concreted and a gate for entrance into the stable grounds has been erected. An outside kitchen has been constructed and furnished with a range. The roof on the hospital porch has been repaired and covered with copper, and nine closets have been fitted up in the hospital building proper. It was found by the medical officer in charge of the hospital that during stormy weather there was a good deal of leaking through the north wall of the building. Although a number of storms have occurred since this work was done, there are no indications that water has penetrated through the walls at any place where the repairs were made. The laundry drain, which became blocked up during the past year, has been repaired, and gives no further trouble. A new washing-machine and mangle have been installed, and after certain changes were made in the machine plant they were found to work satisfactorily.

Besides the above repairs, the hospital has been furnished with a new outfit of iron bedsteads, pillows, air mattresses, rubber matting, stair pads, crockery, etc.

Naval hospital, Chelsea, Mass.—A new line of electric-light conductors extending from Broadway to the main building, also a new line of ten iron posts and electric lights extending from the main entrance to the hospital building along the road and in the grounds, have been erected; and the new iron fence, for the erection and completion of which Congress made special appropriation, has been painted, and adds much to the appearance of the hospital grounds. The ward for contagious diseases has been painted outside and inside; the wainscoting of the corridors has been revarnished and repainted; the floors and other woodwork of the east halls, of the nurses' rooms, of the lavatories and water-closets, have been renovated and painted. The ceiling of the main porch in the hospital building proper has been pointed and painted, and the following minor repairs have also been made, viz: Painting the ambulance stable and the exterior and interior of the boat house, repairing the chimneys and papering the rooms of the senior medical officer's quarters, concreting the floor of the laundry and installing a new laundry plant, repairing the roof, walls, and partitions of the laundry, shingling the boiler house, repairing the roof of the blacksmith shop, putting down a new floor and repairing the ceiling in one of the wards of the main building, repairing the fire boxes of the steam boilers, and installing a new steam-heating apparatus in the attic of the main building. In addition to the above repairs, the hospital has been furnished with a complete outfit of mattresses, pillows, aseptic chairs, and bedside lockers, and a large amount of miscellaneous bedding, table furniture, etc.

Naval hospital, Newport, R. I.—This hospital, erected in 1895 and 1896, requires constant care to retain it in serviceable condition. Several of the wards and rooms have been replastered, the woodwork painted, and uneven floors planed off, baseboards painted, and drains cleaned out and placed in order. A stable for the ambulance and cart, and a small outbuilding in which the implements and tools for use on the grounds could be stored should be constructed. A shallow pond near the main building is a source of annoyance to the hospital employees and patients, and should be either filled up or properly drained.

Naval hospital, New York.—The work of rehabilitating this hospital, which was inaugurated several years ago by the Bureau, has been practically completed, and the hospital and court buildings are now equipped and in a condition to meet any demands that may be made upon the medical department of this station. The new hospital building recently erected has been placed in commission and has increased the capacity of the hospital by 100 beds. The operating room has been refitted and furnished with an additional supply of aseptic furniture, and is now in excellent condition for all operative work. The water-closets, bath rooms, and drainpipes have all been overhauled during the past year, and all the plumbing in the hospital has been carefully repaired. The roadways throughout the hospital grounds have been graded and guttered, the main avenue being paved with adamantine brick, and the roadway between the court and kitchen buildings has been kosmocreted. The floor of the morgue has been concreted and satisfactory repairs made to all sewer connections. The cemetery has been enlarged so as to include an area capable of accommodating 100 additional graves, the grounds have been kept in order, and a number of trees and shrubs have been planted throughout the inclosure. The roof of the main building, which had been in a leaky and unsatisfactory condition for several years, has been thoroughly repaired, and will require no further attention for many years to come. The laundry machinery has been repaired and placed in good condition. The machinery and boilers at this hospital have been in use for many years. They are old and worn-out, and an estimate has been submitted, for transmission to Congress, for installing two new water-tube boilers at this hospital, at a cost not to exceed $5,000. The sanitary condition of the hospital has been satisfactory during the year. The drainage and sewer system has been improved and is now in excellent condition. A careful analysis and microscopic examination of the water supply furnished the hospital show that it is free from all objectionable impurities.

During the year a number of cases of contagious and infectious diseases, including measles, scarlet fever, diphtheria, and erysipelas, have been treated in the annex building in the hospital grounds, and upon their discharge to duty all clothing, bedding, etc., of such cases were subjected to a thorough process of disinfection by means of formaldehyde.

Naval hospital, Philadelphia, Pa.—The following repairs and improvements have been made at this hospital during the past year, viz: A new improved upright hot-water boiler, having an interior copper steam coil and fitted with thermometer and automatic controller, was installed in the kitchen and properly connected with the steam and water systems of the hospital. Since this improvement was made an abundant supply of hot water has at all times been available. The north wall of the kitchen, for a space covering 70 square feet, has been lined with vitreous tiling, and a galvanized-iron canopy has been placed near the ceiling in the same locality, to carry off escaping steam into the chimney. The south kitchen wall, near the sink, part of the adjoining window frame, and the sill of the latter were lined with slate, and the wooden ceiling of the kitchen was repaired. One of the most marked improvements made during the year was the laying of a cement pavement around the entire hospital building in place of the old brick one, which was very much out of repair. This work included the cementing of the sides and floors of areas in front of the hospital, the resetting of all curbing and of the granite steps at the east and south fronts, the substitution of cement steps for the old wooden ones at the terrace west of the hospital, the lining with cement of the inclined area leading to the basement at the north end of the hospital, and building a cement stairway against the same. The above work has been satisfactorily completed, and has added much to the appearance of the grounds immediately around the hospital. The roof of the main hospital building was overhauled and thoroughly repaired, and all the ornamental iron cresting, which was falling to pieces at the spouts of the mansard, and the ornaments on the dormers, were removed. All old tin in the gutters was cut out and replaced with new. The woodwork on all the dormer windows was faced with tin, and the woodwork on all the window frames, molding, etc., was renewed where necessary. The rain leaders, which remained embedded in the walls, were replaced with heavy corrugated galvanized-iron spouting and fixed to the outside of the building. The electric converters and wires carrying the current into the main building, which previously had been attached to the roof and were considered unsafe, were removed and set up on heavy poles.

In the engine department the following repairs were made, viz: The two main boilers were scaled and cleaned; new joints were placed on main stop valves on top of boilers; new connections of 1½-inch extra heavy iron pipe for water columns of main boilers, with 2¼-inch heavy brass petcocks for same. New bridge walls and arch with best fire brick were built under large boilers. The flooring of the ash pits was repaved. Two sets of grate bars and two bed plates were set in place. New liners were fixed to doors of main boilers, and the large Worthington pump was overhauled and put in working order.

Numerous repairs of a minor character were made to the steam, hot and cold water, lighting, and ventilating, and heating systems of the hospital and annexes.

Naval hospital, Washington, D. C.—During the past year only minor repairs and improvements have been made to the grounds and buildings of this hospital. All the woodwork, ceilings, and walls of the building, from basement to attic, have been painted; and the floors, walls, and the outside of the stable have also been painted, as well as the disinfector, iron fence surrounding the hospital, flagstaff, and all tin roofs. One galvanized-iron hot-water boiler 5 feet high and 22 inches in diameter, with a water pressure of 200 pounds, has been installed and all necessary connections made. The boiler in the kitchen has been repaired and put in excellent condition. Besides the above work, minor repairs have been made to the drains, water pipes, etc., whenever it was necessary.

Naval hospital, Norfolk, Va.—The following repairs and improvements were made at this hospital during the past fiscal year, viz: Sixty-three feet of the sea wall, which had been seriously damaged by the storms of last winter, have been rebuilt. The stable has been extended and repaired, and the cemetery wall has been repaired and painted, and 4,500 feet of road in the hospital grounds has been shelled and graded. New gates at entrance to hospital grounds have also been installed. The boilers have been retubed and put in serviceable condition. Within the past month the medical officer in charge of the hospital has informed the Bureau that, owing to the recent storms, extensive repairs to the entire sea wall will have to be undertaken during the next year.

Naval hospital, Port Royal, S. C.—At the beginning of the year 1898 the Bureau erected in the northeast corner of the station and on a site selected for hospital purposes two Ducker portable hospitals, with an annex containing a kitchen and a mess hall.

A cyclone of great severity visited the station on the evening of August 30, 1898, and completely wrecked both the portable hospitals. These have since been replaced by two frame buildings, and the hospital, as it stands to-day, is admirably fitted for the needs of the station. The office, mess hall, lavatory, and storeroom occupy a frame building measuring 16 feet 6 inches by 42 feet. There are two pavilion wards, each with a capacity of 10 beds, and also a small building for the kitchen, which is connected with the office building by a raised platform. The office and the pavilion wards have piazzas on all sides.

In his annual report for the year 1898 the medical officer of the station recommended the construction of a small operating room to be built on the rear of the eastern ward; also the construction of a water-closet and bathroom, and a small outbuilding in which to store coal. The above work has been authorized and the several improvements as recommended have been completed.

In a communication recently received by the Bureau from the medical officer in charge of the hospital, attention is called to certain defects in the ventilation of the buildings, and suggesting measures for its improvement. His recommendations were approved, the work authorized, and the repairs have been completed.

Naval hospital, Pensacola, Fla.—A plant for furnishing the hospital with a larger supply of water has been installed during the past year, and, with the exception of a few minor defects which can easily be remedied, has worked satisfactorily. The plant consists of a windmill, driven well, tower, and tank having a capacity of 5,000 gallons, and the necessary pipes and connections to supply the hospital and surgeon's quarters with an abundance of water. An old cement-lined ice house has been repaired and converted into a cistern, and connected by an underground iron pipe with the down spout of the hospital. The gutters of the hospital roof and verandas have been repaired, and the hospital grounds have been cleaned up and put in excellent order. Six grates were furnished and placed in position at the hospital, and the hearths around the grates have been extended for 12 inches.

Naval hospital, Mare Island, Cal.—The destruction of the old hospital building by an earthquake, which occurred on the evening of March 30, 1898, was fully referred to in the Bureau's last annual report. Since the publication of this report, additional information has been received in this connection from the medical officer in charge of the hospital, from which it appears that the seismic area was extremely limited. The center of the shock extended from east to west along the north shore of San Pablo Bay, through a space of only some 15 miles long by 3 or 4 miles wide, and in which area all damage was done, although the shock was felt through a radius of 50 miles. No lives were lost and only one person was painfully injured. The hospital building was seriously damaged, especially in the center of the two towers, and so much so as to render any repairs to the same out of the question. The great weight of the roof tanks (two in number, with a combined capacity of 5,000 gallons, and nearly full of water) probably had much to do with the great injury to the central part of the building, the wings containing the wards being less affected. None of the other buildings in the hospital grounds were materially injured. The residence of the medical inspector in charge, a frame building, suffered but little damage, there being a few cracks in the plastering and probably some settling of the timbers.

As it was impossible to utilize the building for hospital purposes, an order was received from the commandant of the station to transfer all patients (enlisted men) to the marine barracks, a portion of which was fitted up and designed for use as a hospital, while sick officers were temporarily placed on board of the *Pensacola*. The portion of the building utilized as a temporary hospital consists of several apartments in the south wing of the barracks. There are 3 main wards for patients on the second floor, measuring about 50 by 25 feet, occupying the full depth of the building and opening on the eastern front on a broad balcony or veranda. The heating is by stoves and the lighting by electricity; and the large number of windows affords ample ventilation. Two of the wards are continuous and the third is separated from them by a narrow hall. A room 27 by 25 feet, on the second floor, is occupied by the hospital apprentices.

In close proximity to the wards are two bathrooms, which are utilized for hospital purposes. On the ground floor beneath the wards, and corresponding in size to a single ward, is a mess hall, and the cook house, outside and in the rear, is but a few yards distant.

At the extreme northern end of the barracks, on the second floor, is a small ward 27 by 16 feet, now utilized for patients with tuberculosis, while an adjacent room is occupied by the hospital employees. All the accessory work of the hospital—the shop, stables, laundry, steam-heating plant—is still conducted in the grounds of the old hospital. A large temporary frame building of rough boards, 100 by 40 feet, has been constructed, where the offices, storehouse, dispensary, etc., are situated, there being no suitable space for the same at the barracks.

Recently the Bureau has directed that all officers on arriving at San Francisco or Mare Island, requiring hospital treatment, should be sent to the French Hospital in San Francisco. The provisions for the treatment of the sick above referred to are only of a temporary character, and it is more than probable that within the next few months the new naval hospital, an account of which will be found among "special improvements and repairs at naval hospitals," will have been completed and placed in commission.

Naval hospital, Sitka, Alaska.—The annual report of the Bureau for the year 1898 called attention to the inadequacy of the hospital accommodations of this station and recommended the construction of a small building to be located upon the Government reservation which would meet the requirements of the station. No repairs, except of a minor character, have been made on the building now used for hospital purposes during the past year, as it would be a useless expenditure of money to renovate the present structure, which is old and in danger of tumbling down from the rottenness of its timbers, and its condition has grown steadily worse during the present year. If this station is to be permanently occupied more adequate provision should be made for the care and treatment of naval patients.

Naval hospital, Yokohama, Japan.—The hospital grounds and buildings are in good condition and no very extensive repairs have been required during the past year. There has been but little damage to the buildings from earthquakes and storms. In June, 1898, a portion of the bank which had given way in the previous year was again washed down by an unusually heavy rain, but it was soon restored and placed in such a condition that it is not likely to fall again. The rear verandas have been repaired and painted where necessary, and the upper veranda is now being covered with canvas. All of the buildings have been painted, the lower ward has been repainted, and the upper ward, which was in a very bad state of repair, has been replastered and painted. During the past year the post-mortem room has been repaired and fitted up.

SPECIAL AND CONTEMPLATED IMPROVEMENTS AND REPAIRS AT NAVAL HOSPITALS.

Naval hospital, Chelsea, Mass.—Congress in the act making appropriations for the naval service for the fiscal year ending June 30, 1900, and for other purposes, made the following provision for renovating this hospital, namely:

> Building annex for kitchen, bathroom, closets, lavatories, furniture, and fittings, and general renovation of hospital and appendages, forty-five thousand dollars, to be immediately available.

Preliminary steps have been taken by the Bureau to carry out the provisions of this act. Plans and specifications for this work are now being prepared by the civil engineer attached to the navy-yard, Boston, Mass., and as soon as completed the necessary steps for advertising for bids and awarding the contract will be taken by the Bureau. When the proposed repairs to this hospital are completed it will compare favorably with any of our modern hospitals.

Naval hospital for contagious diseases, Newport, R. I.—This hospital, a full account of which was contained in the Bureau's last annual report, has been completed and placed in commission and fulfills admirably the purpose for which it is intended.

The Bureau has submitted an estimate of $20,000 for an addition to the hospital accommodations at the naval station, Newport, R. I., which is absolutely necessary in order to accommodate the sick of a largely increased number of apprentices on the station. The present hospital only accommodates 24 patients and it has often been filled, and the present hospital building is entirely too small to afford accommodations after an additional number of apprentices occupy the new barracks.

Naval hospital, Mare Island, Cal.—A full description of the circumstances attending the destruction of the old naval hospital building and the preliminary steps that were taken for the construction of a new building was given in detail in the Bureau's report for the past year. After making detailed plans and specifications for the work, it was advertised for on September 1, 1898, and bids for the same were opened in this Bureau at 1 p. m. October 12, 1898.

The following proposals were received:

W. W. Anderson and Robt. Creig, San Francisco, Cal	$97,000
Hannah Bros., 318 Bush street, San Francisco, Cal	94,867
Phil. Sheridan, Berkeley, Cal	91,775
Thomas R. Bassett, Fruitvale, Alameda County, Cal	90,895
F. A. Williams, 40 New Montgomery street, San Francisco, Cal	84,684
Henry Jacks, Box 267, Builders' Exchange, San Francisco, Cal	84,150
C. W. Fletcher, San Francisco, Cal	83,935
Andrew Wilkie, jr., 40 New Montgomery street, San Francisco, Cal	83,607
Dennis Jordan (care J. B. Larner, 1335 F street, Washington, D. C.), San Francisco, Cal	82,000
James B. McKenzie, 318 Bush street, San Francisco, Cal	81,400
Linnott & McCann, 318 Bush street, San Francisco, Cal	79,890
C. C. Blair, Vallejo, Cal	79,650
C. M. Depew and E. L. Brooks, 318 Bush street, San Francisco, Cal	78,815
Hawkins & Lindsay, San Francisco, Cal	78,391
J. P. M. Phillips, 217 Waller street, San Francisco, Cal	76,500
W. L. Prather, jr., Oakland, Cal	75,985
J. H. McKay, 2408 Washington street, San Francisco, Cal	75,820
Matthew McGowan, 1630 Hayes street, San Francisco, Cal	74,000
Andrew Dahlberg, 935 Market street, San Francisco, Cal	72,441
John J. Flanagan, 3722 Third street, San Francisco, Cal	71,000

The contract was awarded to Andrew Dahlberg, December 3, 1898, for the sum of $72,441. Work on the new building was commenced December 19, 1898, and it is hoped that the new hospital will be ready for occupancy early in October next.

Naval hospital, Cavite, Philippine Islands.—The assembling of a largely increased naval force on the Asiatic station, especially around and in the vicinity of the Philippine Islands, as the result of the war between the United States and Spain, rendered necessary the establishment at Manila of a naval hospital, where the sick and wounded officers and men could be properly cared for.

Recognizing the necessity for such action, Admiral Dewey telegraphed the Department January 1, 1899, urging the establishment of a hospital at the naval station, Cavite, stating that a suitable building had been provided, and that it could be prepared and furnished with the necessary hospital furniture for $4,000, and requesting full authority for carrying out his recommendations. As soon as received, immediate action was taken by the Department authorizing the expenditure of $4,000 for repairing and equipping this hospital and informing Admiral Dewey that a medical staff, medicines, and instruments would be forwarded to Manila without delay.

Medical Inspector R. C. Persons was ordered to take passage on the U. S. S. *Solace*, and upon the arrival of that vessel at Manila to report to the admiral commanding the United States naval force on the Asiatic station for duty in charge of the United States naval hospital, Cavite. Instructions were forwarded to the naval laboratory, New York, to prepare and place on board the *Solace*, for the use of the hospital at Cavite, a complete outfit of medicines, surgical instruments, bedding, and hospital furniture. Medical Inspector Persons was further directed by the Bureau, upon his arrival upon the station, to buy such additional articles as were deemed necessary to place the building in condition for the reception and treatment of naval patients.

The Bureau was informed on April 1, 1899, that the main part of the construction work of the hospital was finished, that the dispensary was partially equipped, the storerooms were completed, and that beds had been furnished the hospital and were in place in the ward. It was further stated that the water-supply system and laundry were in process of construction, and that the walls and ceiling had been painted. The building, the second or top story of which had been selected for hospital purposes, is one of a row of storehouses arranged along the water front of the yard. It is connected with the adjoining storehouse by a building two stories in height, stretched along the water front at right angles to the hospital ward, and which, with but little change, has been a rraed for the administrative part of the building.

The kitchen is connected with the administrative building, in which latter building there is a large storeroom, a dining room, a laundry, a bathroom, and a smaller room which is intended to be used as a dining room for the medical staff. One large remaining room was subdivided into a sleeping room for the domestics, two prison cells, and a storeroom for mess supplies. On the upper floor of the administrative building there are rooms for the dispensary, the pharmacist, the nurses, an operating room, two rooms for sick officers, an office, and a spare room. The quarters for the medical officers are located in another building in the yard. A large door opens from the administrative building into the ward, which latter has a number of windows, and, moreover, has a porch built out toward the water front and one on the side, from which a flight of steps leads to the ground, affording direct entrance to the ward. There is a large receiving tank of iron, partially embedded in the ground behind the ward, which takes the overflow of rain water from the two receiving tanks that are elevated above the level of the ward floor. These tanks receive the water collected on the roof of the building. Cement has been laid all over the ground floor, and in addition to this tiling has been laid in the dining room.

In addition to closets built out over the water, a tank with sufficient water supply is being built on the porch just outside of the ward. At the time when it was decided to equip a small hospital for the use of the Navy no place outside of the navy-yard or of the town of Cavite was considered advisable.

NAVY-YARDS.

Navy-yard, Portsmouth, N. H.—There have been 111 cases under treatment at this yard during the year 1898, and of these 77 were discharged to duty and 33 were transferred to the naval hospital, Portsmouth. Of the cases sent to the hospital 7 were transferred for remittent fever, 5 for intermittent fever, and 7 for renal trouble. In the month of July, 1898, the marine force at this yard was increased to 200 men, consequent upon the arrival and detention at this point of the Spanish prisoners of war. Temporary barracks were constructed on Seaveys Island, in close proximity to the stockade which it commanded. While 100 marines were constantly on duty at this point during the stay of the Spaniards, the remainder of the marines here occupied the regular barracks at the yard. Many of the above men had been on duty in Cuban waters, and many had seen service at Guantanamo, and the majority of the cases of malarial fever which developed during the third quarter were among the men who had seen such service.

Marine barracks, Portsmouth, N. H.—The unsatisfactory sanitary condition of these buildings has been reported upon time and again by the various medical officers who have been stationed at this yard. The structure is old, dating from early in the century, and with the present complement of men, 80 in number, there are less than 400 cubic feet of space per man (200 feet less than is allowed by sanitary authorities for men in permanent barracks). In addition to this small cubic air space, the ventilation is wholly inadequate, depending entirely upon doors and windows. During the summer these apertures can be kept open and good ventilation secured, but in the winter season doors and windows must be kept closed when the men turn in for the night, as otherwise they would run great risks from exposure, cold, and drafts. The average height of ceiling in the sleeping quarters of the men is but 9 feet, and the air entering from above, if a window is lowered from the top, is felt appreciably by those whose beds are near the windows. The barracks are theoretically provided with gas illumination, but the supply pipes are so defective that sole reliance is placed on oil lamps, and the products of combustion from this cause add materially to the fetid condition of the atmosphere consequent upon overcrowding and poor ventilation. The plumbing has lately been overhauled and defects in trapping and drainage have been discovered, but these faults are now being corrected. The men's bathroom has been completely remodeled and renovated. A good cement floor has been made and three porcelain-lined bath tubs and six closets of improved pattern have been placed in position. If the present complement of marines is to retained at this station the barracks should be enlarged and renovated and modern methods of ventilation and sanitation introduced.

New naval dispensary.—Congress, in the act making appropriations for the naval service for the fiscal year ending June 30, 1900, and for other purposes, appropriated under the heading of public works, Bureau of Yards and Docks, the sum of $6,000 for constructing a new building to take the place of the old dispensary. Plans and specifications for this work have been prepared by the Bureau of Yards and Docks, and the work will be commenced and completed as soon as practicable. The building will be of brick, with slate roof, two floors, and an attic. On the first floor are two offices, a dispensary room, storeroom, and toilet. The upper floor will be fitted up as living quarters for the hospital steward on duty at the yard. The finish throughout the two floors will be two coats of plaster on lath, ceiling lath to be of expanding metal and finely painted, all finishing wood to be of cypress. The attic will be left unfinished, but placed in such a condition so that it could be subdivided into rooms should this be found advisable. A cistern for holding rain water is placed in the southern half of the cellar.

Ponds on Seaveys Island.—An analysis of the water in these ponds shows an appreciable amount of albuminoid ammonia and other impurities. While this water is not used for drinking or cooking purposes, it is still the source of the ice supply of the yard and station, and it is therefore important to carefully guard against its contamination. It is therefore recommended that these ponds be drained during the coming spring in order to get rid of all sources of impurities and then refilled, which can be accomplished in a very short time.

Navy-yard, Boston, Mass.—The health of this yard has been good, and no epidemic or contagious diseases have made their appearance. Attention is called to the necessity of improving the sanitary condition of the shops, and particularly is this necessary should the yard employ a large force, as the present accommodations are entirely inadequate.

Navy-yard, New York, N. Y.—The general health of the New York Navy-Yard for the year 1898 has been remarkably good. There were 23 cases of catarrhus epidemicus, 7 of these being officers and 16 marines. There were 3 cases of scarlatina, 1 of measles, and 5 of German measles, all of which were sent to the naval hospital, New York, for treatment.

The following is a list of the accidents occurring among the workmen of the yard, first treatment being given at the yard dispensary: Abrasio, 9; ambustio ex calore, 16; contusio, 24; fractura, 13; stremma, 14; dislocatio, 1; vulnus contusum, 98; vulnus incisum, 26; vulnus laceratum, 74; vulnus punctum, 5; insolatio, 4; epilepsia, 2; apoplexia, 1; hemorrhage, 1; total, 288. Of these the following were sent to hospital: Contusio, 1; fractura, 4; dislocatio, 1; apoplexia, 1; epilepsia, 1; vulnus contusum, 1.

Navy-yard, League Island, Pa.—The health of the yard has been comparatively good during the past year and, with the exception of a few cases of measles and mumps, the station has been free from all epidemics.

During the past year the surface of the yard to the west of Main street has been considerably raised by material taken from the back channel, which is being excavated for vessels in reserve. It was thought that the disturbance of such a large quantity of old deposit and its distribution over a large surface would give rise to malarial fevers, but fortunately, however, the station has escaped any bad results from this cause.

The marine barracks are not well adapted for their purpose, being too small, having an insufficient cubic space, ventilation, etc., and being badly arranged. The dispensary is now heated by steam and lighted by electricity. Extensive sanitary improvements are now being made, and when these are finished the hygienic condition of the yard will be satisfactory. As soon as the contemplated system of sewers is carried out and the drainage of the island completed the great objection to this yard from a sanitary point of view will have practically disappeared.

The medical officer, in his sanitary report, states that the laboratory attached to the dispensary has an outfit of chemicals and apparatus which permits of the undertaking of analyses of almost every character, and that such work as the testing of supplies, oils, paints, drugs, assaying of metals, quantitative and qualitative, urinary, and water analyses, and other general analyses can be done completely and satisfactorily. He further calls the attention of the Bureau to the advisability of making this laboratory a testing station for the examination of all supplies for this yard and station which call for a chemical analysis or testing prior to their acceptance.

Navy-yard, Washington, D. C.—The sanitary condition of the yard remains unchanged from last year. Attention is again called to the condition of the mud flats off the yard, and this condition will remain a menace to the health of the yard as long as measures are not instituted for diverting the sewage from the Eastern Branch entirely and delivering it into the Potomac River. The reclamation of the flats and walling in both sides of the channel, as has been proposed, would tend to improve matters, but would not effect an entire cure, as they can hardly produce sufficient sewering of the channel.

With the average complement, practically the same as that for the previous year, there was a diminution in the number of cases of malarial fever. The general sanitary condition of the yard is probably as good as it can be made viewing the condition of the river water which permeates the greater part of the soil on which the yard is built. As it is made ground, consisting largely of ashes and other porous material, the tide water passes easily through it.

Filters are used in the marine barracks and seamen gunners' quarters and are being gradually introduced in the shops. It would be a great improvement if an apparatus for filtering water could be attached to the water pipes as one of the permanent fixtures of the houses, by means of which water used for drinking and cooking might all be filtered.

Injuries and sickness among the workmen employed in the shops called for a good deal of attention on the part of the medical officer of the yard during the year. The shops were in operation for a majority of the time day and night, and the exhausting effects of the summer heat, combined with the prolonged working hours, caused many cases of illness.

The following list embraces the surgical cases of all kinds treated at the dispensary during the year: Incised wounds, 37; contused wounds, 41; lacerated wounds, 32; punctured wounds, 15; contusions, 40; conjunctivitis, 1; amputations, 4; abrasions, 1; sprains, 3; fractures, 4; burns, 5; hernia, 2; foreign bodies in eye, 11.

During the year 1898 epidemic catarrh prevailed extensively among the officers and families of the yard. There was also one case of diphtheria in the family of one of the officers, but it was of so mild a nature as not to call for the use of antitoxin, and the case recovered without any complications.

The medical officer of the yard, in submitting his report, calls attention to the excellence of the ambulance service, its efficiency and promptness at all hours of the day and night.

Navy-yard, Norfolk, Va.—The health of the yard has been good and the number of sick days less than in the previous year.

The number of candidates examined for enlistment was as follows: Volunteer officers: Accepted, 31; rejected, 1; total, 32. Revenue marines: Accepted, 46; rejected, 10; total, 56. Marines: Accepted, 67; rejected, 63; total, 130.

There were 449 emergency cases treated at this yard among the workmen, and of that number the ambulance was required in 37 cases.

The emergency cases treated may be roughly classified as follows: Injuries to the trunk, 10; injuries to the head, 62; injuries to the extremities, 185; injuries to the eye, 31; overcome by gas, 3; heat prostration, 8; acute cramps and colic, 77; other troubles, 72.

In arriving at an estimate of the health conditions at the yard for this year it is almost impossible to give an accurate idea, owing to the frequent changes on the station. It is, however, to be noted that the largest number of sick occurred in the third and fourth quarters, after the troops had returned from Cuba to this station.

The sanitary improvements on the river front still continue in the building of the sea wall and filling in the low places. The deposit of all the refuse of the yard, which was mentioned in the sanitary report for 1897, is now receiving attention and is being gradually improved, with the probability that it will soon be drained and graded and the low ground filled up.

The present method of disposing of the garbage from the ships lying at the navy-yard and from the houses of the officers is objectionable. It is now thrown into the river in shallow water at the upper end of the yard, and this accumulating mass is exposed at low water and may be regarded as a breeding place for disease. A portion of the garbage that is carried off by the tide settles in some other part of the river and produces a menace to health wherever it lodges. Some practicable method should be adopted for disposing of the garbage, either by taking it in small lighters beyond the harbor and there dumping it, or, if this can not be carried out, it should be cremated.

The parade ground utilized by the marines is poorly drained, and after a rain a large section of it is covered with water. It should be better drained or filled in so as to raise the level of the ground considerably.

The marine barracks have been improved recently by the introduction of increased boiler power, which is ample to heat the quarters. Electric lights have been installed, replacing gas, resulting in much greater comfort to the men. The guardroom at the gate requires renovating. The prison cells are unsanitary as now located and should be removed entirely from the building and only the reception cell be kept at the gate. Some measures should be devised to lessen the smoke nuisance in the yard. On several of the smokestacks a smoke-consuming device has been added and gives good results. As the cistern water is gathered from the roofs, a large amount of cinders and soot is carried with the water into the cistern. This is so great that in two cases the water tank in one of the houses and the feed pipe for the hot-water-heating furnace were entirely stopped up by the large accumulation of cinders. As a sanitary measure, steps should be taken at once for the purpose of doing away with this great nuisance. It would very much improve the sanitary condition of the yard if all the water was subjected to filtration, which would remove all suspended and organic matter.

The dispensary has recently been renovated, which has added much to its efficiency, comfort, and cleanliness. The old medical storeroom has been converted into a room for the treatment of emergency cases, and has been fitted up with closets, lavatory, and appliances necessary for the treatment of all cases requiring immediate attention. Owing to the probability that the site now occupied by the dispensary will soon be required for other purposes, the Bureau has requested the Bureau of Yards and Docks to locate a suitable place and construct a building for use as a dispensary.

A great amount of extra work devolved upon the medical officer of the yard in the matter of recruiting, providing medical aid to the various ships without medical officers, and in filling all requisitions. The work was done quickly and efficiently and met with the entire satisfaction of the Bureau.

Navy-yard, Mare Island, Cal.—The health of this yard has been excellent, and no epidemic or contagious diseases have made their appearance. Attention is called to the necessity of providing a separate building for the use of the medical department of the yard, as the old equipment building is badly adapted for the purpose of a medical storehouse and dispensary.

NAVAL STATIONS.

Naval training station, Newport, R. I.—The sanitary condition of this station (including the *Constellation*, which is a part of this station) for the year 1898 has been good. The main building, used as quarters for the apprentices, has been renovated throughout, its toilet facilities increased, the old wooden lower floor removed and replaced by cement, the entire inside repainted, and three cupola ventilators put in ridge of roof. The present accommodations for the proper care of the large number of apprentices are inadequate, but these conditions will be obviated as soon as the buildings for the apprentices, now under construction, are completed.

An outbreak of scarlet fever (32 cases in number) occurred among the apprentices on May 25 and continued until June 21. All were immediately transferred to hospital at the outbreak, part of the apprentices berthing in the upper section of the gymnasium building were removed to berthing space on lower floor, about 50 were sent to quarters in marine barracks made vacant by transfer of marines to Guantanamo, Cuba, and about 100 were established in tents on the western slope of the island. This relief from overcrowding was immediately felt in improved health among the apprentices generally, and while the gymnasium building, the old "sick quarters," and the barracks occasionally developed a new case up to June 21, not a single case was received from those in tents.

There were also sporadic cases of measles, typhoid fever, and an epidemic of influenza, which prevailed in the month of December, but in a mild form.

Torpedo station, Newport, R. I.—The health of this station for the year 1898 has been good, and no infectious diseases have occurred, nor have there been any deaths from any cause.

Among the sanitary improvements made during the year were a general overhauling and renewing, where necessary, of the plumbing and drainage of all residences, offices, and shops, and the installation of new water-closet facilities in places heretofore not furnished with these conveniences. New iron-pipe sewers and drains have also been introduced, and the low frame building near the northern end of the island has been properly fitted up with messing, sleeping, lavatory, and water-closet facilities, and can comfortably accommodate about 75 men. There have been no accidents, explosions, or other mishaps of a serious character on the island during the past year.

The dispensary and sick quarters consist of three rooms, one of these being used as an accident ward and contains two beds. There is also a dispensing room and an office. The attic overhead provides ample space for a storeroom. The building is also furnished with steam heat and running water, and also water-closet and lavatory facilities.

Naval station, Annapolis, Md.—The health of this station has been excellent and free from all endemic and epidemic diseases. The question of sewerage for the Academy grounds should be carefully considered in connection with the construction of the Naval Academy buildings which are now under consideration by the Department.

Marine headquarters, Washington, D. C.—During the past year the barracks were greatly overcrowded, the average complement amounting to 240 men, being an excess of about 40 over the number the quarters provided can properly accommodate.

The buildings are one-story structures, with but little space between the ground and floor upon which the beds are placed. Notwithstanding this condition, the health record has been excellent, no infectious or contagious diseases having occurred.

The proportion of malarial cases to the number of admissions to the sick list has been gratifying, amounting to only about 8 per cent of the patients treated. In 1895 the proportion of such cases was almost 50 per cent, about 33 per cent in 1896, and approximately 20 per cent in 1897.

Naval station, Port Royal, S. C.—The record shows that there were 30 cases under treatment during the year, and the admissions were as follows: Epidemic catarrh, 2; tuberculosis pneumonica chronica, 1; dysentery, 1; sunstroke, 1; conjunctivitis, 1; gastric catarrh, 1; diarrhea, 1; colic, 1; tonsilitis, 1; myalgia, 1; boils, 2; fistula in ano, 1; orchitis, 1; rheumatism, 1; sprains, 1; fracture, 1; contusions, 1; lacerated wounds, 2; incised wounds, 1; alcoholism, 1; intermittent fever, 3, and remittent fever, 2.

The medical officer of the station reports that at the outbreak of hostilities between the United States and Spain he was actively engaged in recruiting and in examining the different members of the several Naval Reserve organizations and other persons to serve during the war. During this period 43 officers and 326 men were examined.

The meteorological conditions during the year 1898 are reported as having been of a peculiar nature. There was scarcely any rainfall from January to August, 1898. On the night of August 30 the rainfall amounted to 10½ inches, and the rainfall for the month of August was a fraction over 24 inches. A cyclone on August 30 was followed by another on October 2, with enormous tides on both occasions.

The slight increase in the number of malarial fevers may be attributed to various causes, such as the unprecedented period of dry weather followed by an enormous rainfall; the large dikes thrown up by the contractors to retain the material pumped up from the river, which interfered with the surface drainage and retained the rain water at the back part of the station, and the increase of the complement of the station.

The question of providing an adequate supply of drinking water for this station is still a serious one. The contractors have bored to a depth of over 1,700 feet, but as yet have had little or no success in obtaining a supply of good water. The station can store 250,000 gallons of water which can be utilized for supplying the boiler plant ashore, tugs, launches, and houses, and furnish the usual supply of drinking water. A large steel water tank barge is being built on the station, and this will be a decided improvement on the old leaky wooden lighters that are now used. The dredging operations in front of the station are still in progress. The mud and sand mixed with rock are pumped ashore, and the low marshy places are gradually being raised to the same level as the high land of the station. Upon the completion of this work, and for obvious sanitary reasons, a thorough system of drainage should be established.

Naval station, Puget Sound, Washington.—The sanitary condition of this station during the year has been excellent. The percentage of sickness has been less than 5 per cent, and the small number of cases of rheumatism and bronchial affections which occurred is rather remarkable when the number of rainy and cloudy days is considered. No accidents occurred on the station during the year, and there were but few venereal cases treated. The mean temperature during the year has been 52° F., and the nights during the hottest weather were always cool. The humidity was rather high and the total rainfall during the year was 32.9 inches, nearly all of which fell between the months of October and April; there were but three snowstorms, and the thermometer was seldom below 32°. There is an upper soil of gravel with a clay subsoil, and the rainfall is rapidly carried away.

The water supply is obtained from wells dug in the lowest part of the station, and from there pumped into two iron reservoirs, each with a capacity of 200,000 gallons. An analysis of the water supply of the station shows that it is of good quality, and at present there is little or no chance for its contamination. Should, however, the town of Bremerton extend toward the northwest, which appears now as the direction of its future development, there will be some likelihood of the drainage from that portion of the town rendering impure the present water supply, and other arrangements will necessarily have to be made for supplying the station with drinking water. The sewerage system is excellent and all sewage is carried into the bay where the tides dispose of it effectually. The new marine barracks are now nearing completion, are of modern design, and substantially constructed. The facilities for ventilating the dormitories are adequate, and the elevators and water-closets are all of modern construction and are easily kept in good sanitary condition. The cells for the confinement of prisoners are sufficiently large, dry, and well ventilated.

During the latter part of the year 1898 a well-equipped dispensary was added to the station. The building assigned for this purpose is centrally located and contains four rooms. Of these, one is used as a dispensary, one as an operating room, one as a surgeon's office, and one as a waiting room. The fittings and furniture for the dispensary proper are complete, and the operating room has been equipped with instrument and dressing cases, irrigators, operating table, etc., and is well adapted to meet the needs of the station.

RECEIVING SHIPS.

U. S. receiving ship Wabash.—No important changes were made in the construction of this vessel during the past year, the principal minor improvements, among others, of a larger supply of water being furnished the ship for sanitary purposes.

The location of the sewer mentioned in several previous reports, which had its outfall opposite this vessel, is not as objectionable as it was formerly, owing to the fact that the sewage of a large portion of the district formerly drained by it has been diverted into the metropolitan system of sewers, one of the main lines of which passes directly through this yard. Considering the fact that there has been on board this vessel an unusually large percentage of men totally unaccustomed to the environments of ship life, the health of this vessel has been remarkably good. With the exception of measles, of which there were eight cases treated during the month of July, there has been no epidemic disease on board. The work of recruiting men for the naval service during the past year was laborious and exacting, and the services of the medical officers engaged on this special duty were arduous. There were examined for enlistment on this vessel during the year 1898, 2,444 persons, of which there were accepted 1,699; rejected for color blindness, 68; rejected for other causes, 677. Besides the above, 3,000 physical examinations for transfers and discharges from service were also made.

U. S. receiving ship Vermont.—The general health of this ship for the past year has been excellent, especially when we consider the fact that the number of men recruited and received on board yearly exceeds that of all other receiving ships and recruiting stations combined.

In the late spring the principal infections were catarrhal in character. The many recruits, unaccustomed to the mode of life, wearing clothing differing from that habitually worn in civil life, gave rise to a large number of colds. Later on a considerable number of cases of malarial infection appeared in those who had been exposed to paludal influences prior to enlistment. In the autumn a number of cases of venereal diseases appeared, and also a limited number of cases of syphilis were observed. Several cases of measles appeared in the persons of recruits recently enlisted, due evidently to infection prior to coming into the service, but by transferring them promptly to the naval hospital the disease was prevented from spreading in the ship. There was also a case of scarlet fever, which occurred probably under the same conditions.

The clothing furnished the recruits, as stated by the medical officer of the ship, was ample and of good material, but many of the men, unaccustomed to the open neck and breast of the uniform, had to pass through a period of acclimatization, during which they suffered more or less from throat and bronchial affections. The underclothing seems to be especially good, and the heavy knitted woolen sweaters can not be too highly recommended. The watch cap is too thin for winter weather, but is a useful garment. The shoes are of excellent quality and of good shape.

Late in the year a most marked and much-needed improvement was made in the washroom of the ship. The old-fashioned toilet arrangements were replaced by a modern system consisting of two large porcelain-lined steel troughs, and partitions separating the individual occupants, and having an automatic flushing attachment, which by means of large tanks of water and self-acting apparatus at frequent intervals washes out the trough with a heavy flush of water. There is a large bath house and a laundry establishment on the cob dock which are both useful and indispensable for the physical comfort of the recruits.

During the year 1898 there were examined physically 5,765 persons, of which number 3,852 were accepted and 1,913 rejected; of the latter number, 38 were rejected because of color-blindness. The number of physical examinations is not a criterion of the number of applicants who presented themselves, because no persons are sent to the medical officer for physical examination except such as satisfy the requirements of the recruiting officer. Many of the applicants are at once refused because of physical defects, which are manifest to the casual observation of a layman, such as manifest defect in height, cachexia, etc., besides those who are over or under the prescribed age.

The applicants examined presented themselves from all parts of the country, while among those of foreign birth the Scandinavian Peninsula and the north of Europe furnished the greater number. Austria and the Latin nations furnished few or none. The northern countries furnished men of the best general physical development.

U. S. receiving ship Richmond.—The health of the ship's company has been good, and no endemic or epidemic diseases have made their appearance during the past year. The sanitary condition of the decks is not satisfactory. The well-worn condition of the deck planks permits a greater absorption of water than is desirable, and with inadequate means of ventilation it is extremely difficult to get them thoroughly dry. This condition is productive of bronchial, digestive, and rheumatic troubles, and should be remedied by repeated painting and shellacking of the berth and gun decks.

The present means of lighting the ship are not only sources of discomfort, but tend to render a lessened state of vitality in the health of the crew. Recently the subject of better ventilation has been considered by the Bureau of Yards and Docks, and it is hoped that a system of electric lights will be installed without unnecessary delay.

Plans and specifications have been submitted for the purpose of removing the ward-room quarters from their present location to the gun deck, and putting the cabin quarters on the spar deck. This change, it is hoped, will receive the Department's immediate approval, which will result in enhancing materially the health of the ship's company and increasing greatly the efficiency of the work of the ship.

During the past year, owing to the number of recruits on board, the berthing space of the ship proved inadequate at times. This, however, was the result of an exigency, and ordinarily the ship can berth her usual complement without discomfort.

The medical officer of the ship, in his annual report, states that the quarters assigned to the medical department as dispensary and examining room are the best that can be provided under the present conditions and arrangement of the space on board.

The medical department of this ship during the past year accomplished a very large amount of work connected with the distribution of medicines to a large number of ships arriving at this yard for the purpose of going into commission or being placed out of commission, and also in rendering professional aid to the officers and crews of such vessels.

The number of men examined during the year was 2,135, of which number 907 were accepted and 1,228 rejected; of the latter number, 54 were rejected because of color-blindness.

U. S. receiving ship Franklin.—The sanitary condition of this ship has recently been improved by shellacking the gun and berth decks, which has kept them free from moisture. A system of electric lights has also recently been installed, which has added much to the efficiency of the work of the ship, as well as to the comfort and convenience of all on board. On account of the deleterious effect on the eyes, caused by the glare of the electric lights, the medical officer, in his annual report, recommends that the lights on board this ship be screened with shades or that ground glass globes be used.

The number of men examined physically during the year was 1,568, of which number 1,099 were accepted and 469 rejected; of the latter number, 12 were rejected because of color-blindness.

U. S. receiving ship Independence.—The medical officer reports that during the past year very decided advantages and improvements have been made on this ship, resulting in less sickness and insuring greater comfort to the crew. The bilges have been opened up by clearing away bulkheads, magazines, chain lockers, etc., and the accumulated mud and débris of years removed. While the ship continues to leak, the bilges are now so freely accessible that nothing of a deleterious nature can exist, and the good results of this work is shown in the greatly reduced number of fever cases in comparison with previous years.

Among the changes introduced may be mentioned the following:

At the distal end of the gangway, reaching to the sidewalk, a large bath house has been constructed, containing 19 shower baths; also a laundry and drying room. On the gangway, nearer the ship, is a wash-house with 35 neatly fitted, porcelain-lined wash basins with water pipes. This house also contains a large copper-lined urinal with running water, while nearer the ship is a number of storage lockers with fresh provisions for the crew. The introduction of these sanitary improvements, with their perfect appointments, will contribute largely to the cleanliness, comfort, and health of the men, and with such conditions prevailing greater efficiency can be expected. A steam heating plant, so much needed during the cold, damp winter weather at this station, is now being installed, and the system will be completed within a few weeks. New modern sanitary water-closets and a comfortable, commodious bathroom have been built.

During the past year the commanding officer of this ship strongly recommended that a building be erected for use as a gymnasium and drill room during bad weather, and it is hoped that his recommendation will be favorably acted upon as soon as possible. In making this recommendation he called attention to the sometimes crowded condition on board this ship, notably at one time during the year when there were 815 enlisted men to be messed and quartered, and suggested that the building above referred to be kept for use as a mess room and sleeping quarters when the ship is thus overtaxed for space. The necessity for such a building was further suggested in the fact that there is no drill ground or space near the ship where proper drills and open-air sports can be carried on. The building recommended would be 80 feet long, 50 feet wide, and 20 feet high.

An epidemic of measles and mumps prevailed on this coast during the spring and summer months, which greatly augmented the number of transfers to the hospital. There were 32 cases of measles and 17 cases of mumps. Catarrhus epidemicus also prevailed extensively and was an important factor in enlarging the sick list, of which disease there were 105 admissions. There were only 8 cases of remittent fever, 1 of intermittent, and 3 of typhoid, showing a healthy contrast following the renovation and cleaning of the ship's bilges. During the year 1,492 recruits were examined as follows: Men (all ratings), 1,246; apprentices, 246. Of these numbers, 886 men and 148 apprentices were accepted.

I can not close the subject of receiving ships without adding my indorsement to the project, now under consideration by the Department, of replacing them by barracks as habitations for enlisted men under instruction or awaiting transfer. The service has already outgrown them; their comforts are already on shore. The *Vermont* has a bath house, laundry, drying room, washhouse, and provision lockers on shore near the vessel, and the commanding officer earnestly recommends the construction of a building for a gymnasium and drill room. A comparison between the condition of the men on the *Richmond* and the men on the *Independence* would convince the most skeptical that a move in the right direction had been made at Mare Island. There is no possible doubt as to the sanitary advantages of barracks as compared with receiving ships. When the latter are crowded, as they often are, and the men are obliged to sleep in two and sometimes three tiers of hammocks, it is a wonder that so many of them are able to resist disease resulting from the breathing of bad air. Barracks can be ventilated thoroughly and systematically. Old wooden ships can only be ventilated by having at least half the occupants sleeping in a draft, to their manifest discomfort and detriment.

INTERNATIONAL MEDICAL CONGRESS AND MEDICAL ASSOCIATIONS.

American Public Health Association.—Medical Director T. C. Walton, U. S. N., represented the Medical Department of the Navy at the meeting of this association, which was held at Ottawa, Canada, September 27–30, 1898. His paper on the proceedings of the conference will be found among the special reports.

International Medical Congress on Tuberculosis.—In compliance with an invitation received by the Department from the German Government, Surg. John C. Boyd was ordered as a delegate to represent the Medical Department of the Navy at the meeting of the congress which convened at Berlin, Germany, on May 24 to 27, inclusive, 1899. A report of the proceedings of the congress, embracing an abstract of the various papers presented for discussion, will be found among the special reports.

American Surgical Association.—Medical Inspector N. M. Ferebee, U. S. N., represented the Medical Department of the Navy at the meeting of this association, which convened at Chicago, Ill., on May 31, 1899. He read an interesting paper entitled "The modern battle ship in war."

American Medical Association.—Application having been made by this association for a representative of the Medical Corps of the Navy to attend its session at Columbus, Ohio, June 6 to 9, 1899, Medical Director Tryon, U. S. N., was designated by the Bureau and ordered by the Department as a delegate from the Medical Department of the Navy.

Association of Military Surgeons of the United States.—This association met in Kansas City, Mo., on the 27th to 29th of September, 1899, and the Medical Department of the Navy was represented by Medical Director George W. Woods, U. S. N. His paper read before the association will be found among the special reports.

NAVY PENSIONS.

The following statement embraces the work performed by the pension division of the Bureau in connection with the examination of the medical records on file in this office during the fiscal year ending June 30, 1899, namely:

Pension cases remaining on hand June 30, 1898	0
Received during fiscal year ending June 30, 1899	2,422
Answered during fiscal year ending June 30, 1899	2,422
Remaining on hand June 30, 1899	0
Cases for board of medical examiners received and answered	227
Cases for retiring board received and answered	25
Certificates of death received	208
Reports of medical survey received and acted upon	1,498
Cases from Civil Service Commission received and answered	34
Cases of physical rejection, transfer of patients, and miscellaneous letters received and answered	924

In contrasting the work of the office with that of the previous year, so far as it relates to the examination of pension claims, it will be observed that there has been a small reduction in the number of calls from the Pension Office received and answered, and it is more than probable that in future this condition will become more pronounced as we recede further from the transactions and events commemorative of and associated with the period during and subsequent to the civil war.

On inquiry at the Pension Office it was ascertained that the naval pension claims filed in that department, and incident to the late war with Spain, amounted to less than 600 cases, and that there has been a very decided diminution in the number of such applications during the past three months. This statement, interesting in itself, is strongly confirmatory of the statistics covering this period, compiled and on file in the Bureau, exemplifying the remarkable freedom from disease experienced by the personnel of the Navy during the recent war.

It was deemed impossible to keep a separate record of the claims filed in connection with the war between the United States and Spain and those pertaining to periods prior to this war, inasmuch as it was frequently found that the medical records showed the disability of the claimant to have been incurred at a period antedating the commencement of hostilities, and there being no evidence to indicate that it had been influenced by the exigencies of war the claim was considered as belonging to a period prior to the war, and as such not included by the Pension Office among the Spanish war cases.

Of the 84 cases (casualties of war) occurring in the Navy during the period of hostilities, April 21 to August 12, 1898, only 17 have filed their claims for pension, and when it is considered that 18 of the casualties were fatal and an equal number of a most serious character, the small percentage (20 per cent) of applicants filing their claims is rather noteworthy. Although the number of pension calls made upon this Bureau has decreased during the past year, the work attending the preparation of medical histories has largely increased owing to the long period spent in the service by those now applying for pension and the more extended and complete clinical records in all cases made by the medical officers during the past twenty years.

The act reorganizing and increasing the efficiency of the personnel of the Navy and Marine Corps of the United States, which became a law on March 3, 1899, has added largely to the miscellaneous work of the office. The passage of this bill has rendered it necessary to furnish the department with the medical histories of a large number of officers in the Navy and Marine Corps whose records have been affected by its provisions.

United States Naval Museum of Hygiene.—During the past year minor repairs have been made to the buildings and grounds, and the bacteriological and chemical departments of the museum have been fully occupied in their special lines of work. During the year 44 additions were made to the exhibit, illustrating sewer pipes (defective and good), building material, steam pipes, fire-clay material, linen fabrics, water filters, emergency packages as furnished and found on board the Spanish war vessels, X-ray photographs, and ventilation. The total number of articles now on exhibit at the museum is 1,953.

A large number of chemical examinations have been made, the principal articles analyzed being foods, disinfectants, water, urinary calculi, etc. A series of experiments was carried out to determine the efficiency of Maignen's patent section water filter, the special point in question being the separation of As_2O_3 from drinking water by its passage through this filter. Specimens of gum-elastic catheters and bougies were also tested chemically and physically to determine their durability when subjected to heat and disinfecting agents. Very many microscopical and bacterial examinations have been made to determine the presence of the bacillus tuberculosis, bacillus of diphtheria, malarial parasites, and typhoid infection. Specimens from tumors were sectioned and examined to determine their benign or malignant characters, and the diagnosis was confirmed by a microscopical examination in a case of suspected parasitic skin disease.

The library of the museum at this time consists of 11,853 bound volumes.

In concluding this report, special attention is called to the excellent sanitary conditions existing in the Navy, and especially in the Asiatic squadron, during the past year. Early precautions were taken to prevent as far as possible the ill effects resulting from necessary climatic exposure, and to give the best care and attention to the sick. The result has proved their efficacy, and the sick reports from the vessels in the Philippines indicate a high standard of physical efficiency in the squadron.

Very respectfully,
W. K. VAN REYPEN,
Surgeon-General, United States Navy.

THE SECRETARY OF THE NAVY.

Estimate of appropriations required for the service of the fiscal year ending June 30, 1901, by the Bureau of Medicine and Surgery, Navy Department.

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1900.
SALARIES.			
Bureau of Medicine and Surgery:			
Chief clerk (act of Feb. 24, 1899)	$2,000.00		
One clerk, class 3 (same act)	1,600.00		
One clerk, class 2 (same act)	1,400.00		
One clerk, class 1 (same act)	1,200.00		
One clerk, class E (same act)	1,000.00		
One laborer (same act)	660.00		
One janitor for naval dispensary (same act)	600.00		
One laborer for naval dispensary (same act)	480.00	$8,940.00	$8,940.00
In compliance with the provisions of the act approved February 24, 1899, the following force, now employed in this Bureau and at present paid, as herein below stated, from appropriations "Increase of the Navy," and "Pay of the Navy," is recommended to be transferred to the regular establishment; its services are absolutely necessary for the regular and permanent work of the Bureau, in addition to the present permanent force:			
One clerk, class E, $3.26 per diem, $1,020.38 per annum.	1,020.38		
One clerk, class D, $3.04 per diem, $951.52 per annum.	951.52		
Two clerks, class C, $69 per month, $829.50 per annum.	1,680.00	3,651.90	....
One assistant messenger, class B (submitted)	720.00	720.00	....
This Bureau has neither a messenger nor an assistant messenger. The services of one are absolutely necessary for the work of the Bureau.			
NOTE.—This estimate includes the following clerks regularly employed in this Bureau, but borne on the rolls below mentioned: One clerk of class E and 1 clerk of class D, borne on the rolls of Bureau of Construction and Repair, and 2 clerks of class C, now paid from "Pay of the Navy," enlisted as chief yeoman, at $60 per month and one ration, $829.50 per annum.			
MEDICAL DEPARTMENT.			
For surgeons' necessaries for vessels in commission, navy-yards, naval stations, Marine Corps, and coast survey, and for the civil establishment at the several naval hospitals, navy-yards, naval laboratory, and department of instruction, Museum of Hygiene, and Naval Academy, $75,000 (appropriated, act of Mar. 3, 1899)	75,000.00	75,000.00	75,000.00
NAVAL HOSPITAL FUND.			
For maintenance of the naval hospitals at the various navy-yards and stations, and for care and maintenance of patients in other hospitals at home and abroad, $20,000 (appropriated, act of Mar. 3, 1899)	20,000.00	20,000.00	20,000.00

Estimate of appropriations required for the service of the fiscal year ending June 30, 1901, by the Bureau of Medicine and Surgery, Navy Department—Continued.

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1900.
CONTINGENT, BUREAU OF MEDICINE AND SURGERY.			
For freight, expressage on medical stores, tolls, ferriages, transportation of sick to hospitals, transportation of insane patients; care, transportation, and burial of the dead; advertising; telegraphing; rent of telephones; purchase of books and stationery; binding of medical records, unbound books, and pamphlets; postage and purchase of stamps for foreign service; expenses attending the medical board of examiners; rent of rooms for naval dispensary; hygienic and sanitary investigation and illustration, sanitary and hygienic instruction; purchase and repairs of wagons and harness; purchase of and feed for horses and cows; trees, plants, garden tools, and seeds; furniture and incidental articles for the museum of hygiene, naval dispensary, Washington; naval laboratory, sick quarters at Naval Academy and marine barracks, surgeons' offices and dispensaries at navy-yards and naval stations; washing for medical department at Museum of Hygiene, naval dispensary, Washington; naval laboratory and department of instruction, sick quarters at Naval Academy and marine barracks, dispensaries at navy-yards and naval stations and ships and rendezvous, and for minor repairs on buildings and grounds of the United States Naval Museum of Hygiene, and all other necessary contingent expenses, $30,000 (appropriated, act of Mar. 3, 1899)	$30,000.00	$30,000.00	$30,000.00
REPAIRS, BUREAU OF MEDICINE AND SURGERY.			
For necessary repairs of naval laboratory and department of instruction, naval hospitals and appendages, including roads, wharves, outhouses, sidewalks, fences, gardens, farms, and cemeteries, $20,000 (appropriated, act of Mar. 3, 1899)	20,000.00	20,000.00	20,000.00
NAVAL HOSPITAL, NEW YORK.			
Submitted.—For removing old boilers, condemned as worn-out and worthless, and furnishing and installing two new water-tube boilers at naval hospital, New York, $5,000	5,000.00	5,000.00	....
Explanatory note.—The old boilers have been in use for many years. They have been repaired and patched until they are now beyond repair. They have been surveyed under the direction of the Chief of the Bureau of Steam Engineering, who condemns them as unfit for further repairs.			
NAVAL HOSPITAL, MARE ISLAND, CAL.			
Submitted.—For new boiler house, boilers, and equipment for naval hospital, Mare Island, Cal., $10,000	10,000.00	10,000.00	....
Explanatory note.—The present boiler house is an old building, out of repair. It was originally placed in a ravine below the hospital and the drainage was through the tules to the river. The tules having been recently filled by dredging from the river has made the site of the boiler house lower than the adjacent land. The cost of a new boiler house would be but little more than the cost of repairs to the old building and the building of new sewers and installing a pumping system to lift the draining to a higher level. The boilers are old and worn-out, and can not be further repaired.			
NAVAL HOSPITAL, NEWPORT, R. I.			
Submitted.—For an addition to the naval hospital at Naval Training Station, Newport, R. I., $20,000	20,000.00	20,000.00	....
Explanatory note.—This addition is rendered absolutely necessary in order to accommodate the sick of a largely increased number of apprentice boys at the station. One hundred and twenty-five thousand dollars was appropriated at the last session of Congress for additional barracks, and these will soon be ready for occupancy, and the number of apprentices will be doubled. The present hospital only accommodates 24, and it has often been filled. It will be simply impossible to afford proper hospital accommodations to the sick apprentices with the present hospital building after an additional number of boys occupy the new barracks.			

STATISTICAL REPORT

OF THE

HEALTH OF THE NAVY AND MARINE CORPS FOR THE YEAR 1898.

Notwithstanding the fact that the calendar year 1898 embraces the period covered by the operations of war, with the unfavorable influences upon health incident to prolonged cruising in tropical waters, the ratio of admissions to the sick list per 1,000 of strength shows but a slight increase over years in which peace prevailed, the ratio being 871.69 for 1898, as against 838.53 in 1895, 777.75 per 1,000 of strength in 1896, and 748.24 in 1897.

The average strength of the active list for 1898 was 23,986, an increase in the force of the Navy and Marine Corps of 8,152 over the previous year.

Complete returns were received by the Medical Department from a force of 23,038, making a difference of 948, which represents those on detached service and leave from whom no regular returns were received. The great increase in the difference between the average strengths as given in Table I, over that for previous years, is due to the fact that during the war a large number of persons were serving with the auxiliary naval force, performing duty on vessels patrolling the various harbors, and from whom no regular returns were received except reports of survey and certificates of death.

The average strength as shown by reports of the Medical Department is employed in computing all ratios except those for deaths and invaliding from the service.

The total number of admissions for disease was 16,021 and for injuries 4,061, affording a ratio per 1,000 of strength of 695.042 and 176.27, respectively. The ratios for 1897 were 594.46 and 153.79.

The daily average of patients was 678.63, and the ratio per 1,000 of strength 29.46, as against a ratio of 29.82 in 1897.

The total number of sick days was 247,705, giving an average of 10.75 days for each man of the Navy and Marine Corps, and 12.33 days as the average duration of treatment per case.

In 1897 the average number of sick days for each man was 10.88, and the average number of days each case was treated, 14.55.

The number of persons invalided from the service (including retirements of officers for disability and transfers to the Government Hospital for the Insane) was 884, giving a ratio per 1,000 of strength of 36.85. In 1897 there were only 328 persons invalided from the service, and the ratio per 1,000 of force, 20.85.

There were 173 deaths reported during the year, of which 118 were from disease and 55 from injuries. If to the total number of deaths, as shown in Table I, those lost in the destruction of the *Maine* be added, there would be an unusually high death rate for the year, or 17.21 per 1,000, while the ratio per 1,000, as computed from the number of deaths exclusive of the *Maine* casualties, was only 7.21, this being an increase over the ratio for 1897, 5.59 deaths in the 1,000.

The 260 deaths on the *Maine* were reported in the "Special appendix," Report of the Surgeon-General for the year 1897, and are not included in the statistical tables for the present year except in Tables VII and VIII dealing with statistics of the force afloat, where they appear as deaths under "Injuries," Class XII.

There were 23 deaths during the year from gunshot wounds, of which 18 resulted from casualties of battle. The deaths from this cause in 1897 were 3.

Among the deaths from diseases peculiarly incident to war and tropical cruising were 4 from dysentery, 1 from smallpox, and 1 from yellow fever. There were only 12 deaths reported in the Navy from typhoid fever during the year.

The prevalence of special diseases, with relation by scale, is shown in Table XIII.

RECRUITING.

The following table shows the record of enlistments and rejections for the year 1898:

Where examined.	Number examined.	Number accepted.	Number rejected.	Color blind.
Boston, receiving ship Wabash	2,444	1,699	677	68
New York, receiving ship Vermont	5,765	3,852	1,875	38
Philadelphia, receiving ship Richmond	2,175	932	1,189	54
Norfolk, receiving ship Franklin	2,119	1,483	610	26
Mare Island, receiving ship Independence	1,510	1,033	322	155
Boston, marine rendezvous	699	532	148	19
New York, marine rendezvous	708	266	275	167
Philadelphia, marine rendezvous	917	488	416	13
Washington, marine headquarters	255	178	72	5
San Francisco, marine rendezvous	432	256	165	11
Vessels and shore stations other than receiving ships and marine rendezvous	14,508	11,048	3,222	238
Total	31,532	21,767	8,971	794
RECAPITULATION.				
Receiving ships	14,013	8,999	4,673	341
Marine rendezvouses	3,011	1,720	1,076	215
Vessels and shore stations	14,508	11,048	3,222	238

Number rejected per 1,000, 309. Color blind per 1,000, 25.

INSANE OF THE NAVY.

Number of patients from the Navy and Marine Corps in the Government Hospital for the Insane on June 30, 1898	91
Admitted during the year (4 officers and 39 seamen and marines)	43
Total	134
Discharged during the year (15 died, 17 recovered, 3 improved)	35
Remaining in that institution June 30, 1899 (13 officers and 86 seamen and marines)	99

NAVAL HOSPITALS.

SUMMARY FOR THE YEAR 1898.

Cases met with in the hospitals appear, as a rule, in the returns from the stations where the disease or injury was contracted. All such cases are indicated in Table XII, p. 92, in the column "Readmitted," while diseases or injuries first recorded in hospitals appear in the same table in the column "Admitted," and are regarded as original admissions.

NAVAL HOSPITALS, 1898.

Hospitals.	Number of cases under treatment.				Number invalided from service.				Number dead.				Number discharged to duty.				Average number daily under treatment.	Average number of days' treatment per case.
	Remaining from last year.	Admitted during the year.		Total.	Diseases.	Injuries.	Total.	Ratio per 1,000 of cases treated.	Diseases.	Injuries.	Total.	Ratio per 1,000 of cases treated.	Diseases.	Injuries.	Total.	Ratio per 1,000 of cases treated.		
		Diseases.	Injuries.															
Portsmouth, N. H	6	114	12	132	12	5	17	128.79	......	......	......	......	76	7	83	628.79	10.54	29.14
Chelsea, Mass	22	462	45	529	84	6	90	170.13	6	......	6	11.34	259	23	282	533.08	57.30	39.53
Newport, R. I	7	215	16	238	4	......	4	16.81	3	......	3	12.61	199	14	213	894.96	13.98	21.44
Brooklyn, N. Y	72	745	156	973	204	57	261	268.24	32	......	32	32.89	440	80	520	531.43	99.74	37.41
Philadelphia, Pa	19	369	50	438	51	11	62	141.55	5	......	5	11.42	275	33	8	703.20	35.53	29.61
Washington, D. C	8	201	18	227	20	4	24	105.73	2	1	3	13.22	165	13	178	784.14	15.88	25.53
Norfolk, Va	41	564	122	727	152	34	186	255.85	10	......	10	13.76	372	65	437	601.10	53.66	26.94
Pensacola, Fla	2	38	2	42	2	......	2	47.62	......	......	......	......	36	2	38	904.76	2.56	22.24
Mare Island, Cal	61	325	39	425	86	19	105	247.06	10	......	10	23.53	247	19	266	625.88	40.13	34.47
Sitka, Alaska	......	25	7	32	......	......	......	......	1	......	1	31.25	22	4	26	812.50	2.81	32.06
Yokohama, Japan	6	39	1	46	2	......	2	43.48	2	......	2	43.48	31	1	32	695.65	7.65	60.70

NAVAL HOSPITALS.

The various naval hospitals had under treatment during the year 3,671 patients, an increase over the previous year of 1,677. The average number of patients daily under treatment in the various naval hospitals was 339.75, a ratio of 14.74 per 1,000 of force.

During the previous year the daily average was 233.38, and the ratio per 1,000 of force, 15.32.

The average number of days' treatment per case was 33.78 for 1898 and 42.50 for 1897.

The deaths numbered 72, and the invalided from service 735, the ratio per 1,000 of cases treated being 19.61 for the former and 200.21 for the later. The ratios for the previous year were 18.46 and 117.76, respectively.

Eighteen patients were transferred to the Government Hospital for the Insane.

The diseases most prevalent and the causes of death and invaliding are shown in the following detailed statements of the various hospitals.

NAVAL HOSPITAL, PORTSMOUTH, N. H.

(*Statistics.*)

Surgeon E. Z. DERR, U. S. N., *In charge.*

One hundred and twenty-six cases were admitted during 1898 and 6 remained from 1897, making the total number under treatment 132, an increase of 77 when compared with the previous year.

The average number daily under treatment was 10.54; previous year, 5.22. The average number of days' treatment per case was 29.14; previous year, 34.60.

There were no diseases of an epidemic nature treated at this hospital during the year.

Seventeen cases were discharged from the service for disability, the rate per 1,000 cases treated being 128.79; previous year, 18.18. The principal cases of invaliding were: Hernia, 3 cases; phthisis, 2, and nervous affections, 3.

One patient was transferred to the Government Hospital for the Insane with melancholia.

There were no deaths as was the case in 1897.

NAVAL HOSPITAL, CHELSEA, MASS.

(*Statistics.*)

Medical Director J. G. AYERS, U. S. N., *In charge.*

There were 529 cases under treatment during the year, including 22 remaining from 1897. The number during the previous year was 141.

Among those admitted were 23 cases of malarial affections, 18 of rheumatic affections, 11 of neurasthenia, 10 of phthisis, 8 of typhoid fever, 6 of dysentery, 5 of pneumonia, 4 of nephritis, 3 each of meningitis, appendicitis, intestinal catarrh, and organic heart disease, and 1 case each of diphtheria, rubella, and scarlatina among the general infectious diseases.

The average number of cases daily under treatment was 57.30; for previous year, 21.69.

The average number of days' treatment per case was 39.53; for previous year, 56.14.

Ninety cases were invalided from service, the ratio per 1,000 of cases under treatment being 170.13.

The ratio for the previous year was 198.58.

The leading causes being venereal diseases, 15 cases; rheumatism, phthisis, neurasthenia, and hernia, 5 each; valvular disease of the heart, 3 cases, and 1 from rupture of the ear drum.

There were 6 deaths; 2 caused by typhoid fever and 1 each by pneumonia, meningitis, pneumonic tuberculosis, and chronic intestinal catarrh.

The rate per 1,000 cases under treatment was 11.34; for previous year, 21.28.

One case of mania was transferred to the Government Hospital for the Insane.

NAVAL HOSPITAL, NEWPORT, R. I.

(*Statistics.*)

Surgeon C. A. SIEGFRIED, U. S. N., *In charge.*

Two hundred and thirty-eight cases were treated at this hospital during the year. The average number daily under treatment was 13.98, and the average number of days treatment per case 21.44, as against 10.54 and 14.57, respectively, for 1897.

Of diseases of an epidemic nature there were 33 admissions for scarlet fever and 1 for cerebro-spinal meningitis.

Five patients were under treatment for pneumonia and 1 for typhoid fever.

There were 4 persons invalided from the service, giving a ratio per 1,000 of cases treated of 16.81; the ratio for the previous year was 3.79.

Three deaths occurred at this hospital; 1 each from epidemic cerebro-spinal meningitis, typhoid fever, and acute miliary tuberculosis; the ratio per 1,000 of cases treated being 12.61, as against 18.94 for the previous year.

There were only 10 admissions for venereal diseases.

NAVAL HOSPITAL, BROOKLYN, N. Y.

(*Statistics.*)

Medical Director GEORGE W. WOODS, U. S. N., *In charge.*

During the year 1898 there were under treatment 973 cases, an increase over the previous year of 504.

The average number of cases daily under treatment was 99.74, and the average duration of treatment per case 37.41; for the previous year 63.35 was the average daily number of patients, and the average period of treatment 49.30 days.

There were treated at this hospital during the year 65 cases of malarial affections, 9 of this number having malarial cachexia; 24 cases of typhoid fever, 22 of pneumonia, 6 of dysentery, 28 of articular rheumatism, 9 of appendicitis, and 163 cases of injuries.

The number invalided from the service was 261, a ratio of 268.24 per 1,000 of cases treated, as against 159.92 per 1,000 in 1897. The principal causes of invaliding were: Diseases of the nervous system, 36; venereal diseases, 35; injuries, 32; hernia, 24; phthisis, 19; articular rheumatism, 12, and cardiac affections, 11.

The deaths numbered 32, giving a ratio per 1,000 of cases treated of 32.89; for former year 14.93.

Five deaths resulted from nephritis; 5 from phthisis; 4 from pneumonia; 3 each from cancer and valvular disease of heart; 2 each from appendicitis and septicæmia, and 1 each from alcoholismus, diphtheria, encephalitis, hemiplegia, hepatitis, meningitis, remittent fever, and typhoid fever.

Eight patients were transferred to the Government Hospital for the Insane—4 for melancholia, 3 for dementia, and 1 for mania.

NAVAL HOSPITAL, PHILADELPHIA, PA.

(*Statistics.*)

Medical Director GEORGE H. COOKE, U. S. N. (retired), *In charge.*

Four hundred and thirty-eight cases were treated at this hospital during the year, an increase over the previous year of 220 patients.

The average number daily under treatment was 35.53, and the average duration of treatment per case 29.61 days, as against 20.20 and 33.82, respectively, for 1897.

Among the acute infectious diseases admitted were 41 cases of typhoid fever; 18 cases of articular rheumatism; 7 of pneumonia; 3 each of dysentery, measles, and mumps, and 1 case of yellow fever. The case of yellow fever was that of an officer, a convalescent, transferred from Key West, Fla.

Sixty-two patients were invalided from the service, giving a ratio per 1,000 of cases treated of 141.55; for previous year 123.85. The principal causes of invaliding were as follows: Nine cases each of venereal diseases and nervous affections; 6 of articular rheumatism; 4 of phthisis, and 3 of cardiac disease.

Five patients died during the year, giving a ratio per 1,000 of cases treated of 11.42; for previous year 13.76.

The causes of death were as follows: One each from typhoid fever, pneumonia, tuberculosis, epilepsy, and valvular disease of the heart.

One patient with paranoia was transferred to the Government Hospital for the Insane.

NAVAL HOSPITAL, WASHINGTON, D. C.

(Statistics.)

Medical Director GEORGE H. BRIGHT, U. S. N., *In charge.*

During the year 227 patients were treated in this hospital, as against 166 for 1897.

The average number daily under treatment was 15.88; for 1897, 15.55.

The average number of days' treatment per case was 25.53; for 1897, 34.18.

Of general infectious diseases there were treated at this hospital during the year 5 cases of diphtheria, 36 cases of malarial affections, and 1 case each of pneumonia and typhoid fever.

Twenty-four persons were invalided from the service, giving a ratio of 105.73 per 1,000 of cases treated; for previous year, 60.24.

The principal causes of invaliding were as follows: Venereal diseases, 4 cases; enuresis, 3 cases; phthisis, 2 cases, and hernia, 2 cases.

There were 3 deaths in this hospital; 1 each from diphtheria, fracture of skull, and miliary tuberculosis, giving a ratio per 1,000 of cases treated of 13.22; for previous year, 6.02.

One case of melancholia was transferred to the Government Hospital for the Insane.

NAVAL HOSPITAL, NORFOLK, VA.

(Statistics.)

Medical Director C. J. CLEBORNE, U. S. N., *In charge.*

There were treated at this hospital during the year 727 cases, an increase of 390 patients over 1897.

The average number daily under treatment was 53.66; previous year, 30.73. The average duration of treatment per case was 26.94 days, the period for 1897 having been 33.28 days.

Among the general infectious diseases treated were 54 cases of malarial affections, 23 of typhoid fever, 30 of articular rheumatism, 8 of pneumonia, and 1 of dysentery.

The hospital had a large number of venereal cases under treatment during the year, amounting to 182. There were 127 patients under treatment with injuries; 26 of this number with gunshot wounds.

One hundred and eighty-six persons were invalided from the service, giving a ratio per 1,000 of cases treated of 255.85; for previous years, 109.79. The principal causes of invaliding were: Venereal diseases, 39; injuries, 34; nervous diseases, 24; phthisis, 11; diseases of the heart, 9; articular rheumatism, 7; diseases of the visual apparatus, 7, and ear diseases, 4.

Ten deaths were reported from this hospital, giving a ratio of 13.76 per 1,000 of cases treated; for previous year, 11.89 per 1,000.

The causes of death were 2 each from typhoid fever and meningitis; and 1 each from articular rheumatism, arteriosclerosis, cancer, diabetes, nephritis, and phthisis.

Three patients were transferred to the Government Hospital for the Insane; 1 each for dementia, mania, and melancholia.

NAVAL HOSPITAL, PENSACOLA, FLA.

(*Statistics.*)

Passed Assistant Surgeon H. N. T. HARRIS, U. S. N., *In charge.*

Forty-two cases were under treatment at this hospital during the year, the average number daily under treatment having been 2.56, as against 0.98 for 1897. The average duration of treatment per case was 22.24 days, as against 35.80 for 1897.

The ratio of invaliding per 1,000 of cases treated was 47.62.

There were no deaths or transfers to the Government Hospital for the Insane during the year.

NAVAL HOSPITAL, MARE ISLAND, CAL.

(*Statistics.*)

Medical Inspector GEORGE P. BRADLEY, U. S. N., *In charge.*

There were under treatment at this hospital during the year 425 patients, the daily average number having been 40.13 and the average duration of treatment per case 34.47 days; the record for 1897 was 52.17 and 57.71, respectively.

The ratio per 1,000 of cases treated of invaliding from the service was 247.06; for the previous year, 172.73.

The principal causes of invaliding, of which there were 105 cases, were: Injuries, 19; venereal diseases and phthisis, 17 cases each; nervous affections, 16; heart disease, 6, and articular rheumatism, 4.

Ten deaths occured at this hospital, giving a ratio per 1,000 of cases treated of 23.53; for previous year, 27.27.

The deaths were from the following diseases: Phthisis, 4; and 1 each from aneurism, angina pectoris, apoplexy, chronic intestinal catarrh, pneumonia, and typhoid fever.

Three patients were transferred to the Government Hospital for the Insane; 1 each with dementia, mania, and paranoia.

NAVAL HOSPITAL, SITKA, ALASKA.

(*Statistics.*)

Passed Assistant Surgeon S. S. WHITE, U. S. N., *In charge.*

This hospital had under treatment 32 patients during the year, the same number as in 1897.

The average number daily under treatment was 2.81 and the average duration of treatment 32.06 days; for previous year 2.24 and 25.50, respectively.

There was 1 death at this hospital, due to pneumonia.

NAVAL HOSPITAL, YOKOHAMA, JAPAN.

(*Statistics.*)

Surgeon FRANK ANDERSON, U. S. N., *In charge.*

There were only 46 patients treated in this hospital during the year, a decrease of 31 as compared with 1897.

The daily average of patients was 7.65 and the average duration treatment 60.70 days; for previous year, 10.71 and 50.74, respectively.

There was no invaliding from the service reported during the year, and only 1 death, the cause being pneumonia.

SPANISH PRISONERS OF WAR.

(*Statistics.*)

The Spanish prisoners of war, taken at the time of the destruction of Admiral Cervera's squadron at Santiago, Cuba, July 3, 1898, were received on the various ships of the North Atlantic Squadron and later transferred to the United States, where they were distributed as follows: The seriously wounded officers and men to the naval hospital, Norfolk, Va., the slightly wounded or uninjured officers to the Naval Academy, and the remaining men to the United States navy-yard, Portsmouth, N. H.

Before dealing with the medical reports from the various shore stations, the record as furnished by the U. S. ambulance ship *Solace*, on which the seriously injured were transferred to the naval hospital, Norfolk, will first be presented.

U. S. ambulance ship Solace.—There were received from the vessels of the North Atlantic Squadron 53 wounded belonging to the personnel of Admiral Cervera's squadron, 6 of whom died while being transferred to the naval hospital, Norfolk, Va. The causes of death were as follows:

(1) Wound inflicted by rifle ball passing from left groin through pelvis, making its exit 2 inches posterior to head of femur. Died July 10.

(2) Wound of left leg and right foot. Died July 13.

(3) Wound involving entire back from lower scapular region to lumbar region. Died July 11.

(4) Compound comminuted fracture of thigh; resection of femur. Died July 9.

(5) Shell wound of abdomen; abdominal section. Died July 6.

(6) Saline infusion practiced on moribund man. Died July 4, shortly after arrival.

The following operations were performed on board the ambulance ship:

(1) Removal of fragment of shell from foot.
(2) Resection of femur.
(3) Amputation, middle third of thigh.
(4) Resection of os calcis.
(5) Amputation of neck of humerus.
(6) Resection of ulna.
(7) Amputation left middle finger.
(8) Amputation right thumb.
(9) Amputation left middle finger.
(10) Resection of tibia.
(11) Amputation at knee joint.
(12) Amputation of left arm.
(13) Amputation at middle of left leg.
(14) Resection of femur.
(15) Resection of scapula.
(16) Resection of femur.
(17) Abdominal section.

Naval Hospital, Norfolk, Va.—Forty-seven wounded officers and men belonging to the Spanish squadron were admitted to this hospital July 16, 1898. Three deaths occurred during the period they were in the hospital (July 16, 1898, to September 7, 1898), the cases being as follows:

(1) Amputation of hip joint, necessitated by compound comminuted fracture of left femur. Suppuration profuse. Operation performed July 23. Death ensued in about two hours.

(2) Typhoid fever. Case was in third week of disease upon admission to hospital. Died August 8.

(3) Collapse. A sailor became pulseless shortly after admission to hospital; failure to respond to stimulants. Died in afternoon of day of admission. No serious wounds were noted.

In nearly all of the cases treated at this hospital infection of the wounds was present, this having occurred during the time that elapsed between the reception of the injuries and the primary dressing, being in all cases many hours and in some instances not until the succeeding day. At the time of discharge from the hospital all the patients were considered in satisfactory condition for transportation to Spain except two cases—one of suppuration of knee joint, and the other suppurating wounds in a man with highly albuminous urine.

United States Naval Academy.—There were forty-five admissions to the sick list of the Spanish officers at this station, the cases being principally of malarial fevers and wounds. The number of sick days was 403, giving an average duration of treatment per case of about eight days. There was not a single death reported from this station among these patients.

On September 8, the date of their discharge from custody, there was only one patient on the sick list and the condition in his case was noted as satisfactory.

Navy-Yard, Portsmouth, N. H.—Of the 20 officers and 1,661 men confined at "Camp Long," established at Seaveys Island, near Portsmouth, N. H., there were treated by the medical officers 1,023 patients; of which number 272 were admitted to the naval hospital, Portsmouth, and the remainder prescribed for at the camp.

During the period extending from the arrival of the first detachment, on July 11, until the date of their repatriation, there were 30 deaths among the prisoners, the causes being as follows: Remittent fever 27 cases (the diagnosis in most of these cases, as made by the Spanish medical officers, who were also in attendance upon the patients, was "catarro gástrico-tífico"), and one case each of cachexia malarialis, dysentery, and paraplegia.

Twenty of these deaths occurred in the first eight days after arrival, and only four during the last month of their stay at the camp.

Almost all the cases treated were reported as remittent fever, the disease being described by the chief medical officer of the Spanish squadron in words of which the following is a liberal translation:

> The number of sick treated at Portsmouth, N. H., during our stay exceeds 1,000, the disease the result in most instances of a single infection, to wit, malaria. In the greater number it is susceptible of proof that the determining factor was their occupation of the trenches around Santiago de Cuba from the time of the advance of the American forces until the date of departure from that port (twelve days), during which time they were subjected to the unfavorable influences of sun and soil while conveying ammunition and supplies to the troops.
>
> There were two types of malarial infection observed: First, the remittent, with intestinal disturbances, abdominal typhoid symptoms, alteration of and absorption of hepatic fluid, and ataxic cerebro-spinal phenomena, the urinary analysis being negative as to presence of albumen; and second, the intermittent form, with its periods of perfectly marked chill, fever, and sweating.

FORCE AFLOAT.

Statistics.

The average strength of the force afloat during the year 1898 was 19,469, distributed as follows:

North Atlantic Station, 13,555; Asiatic Station, 2,188; Pacific Station, 1,372; and receiving ships, 2,354.

Eighty-four per cent of the total force of the Navy and Marine Corps was afloat during the year 1898, as against 79 per cent for 1895, 78 per cent for 1896, and 80 per cent for 1897.

The average number of the admissions to the sick list per man on the cruising vessels of the North Atlantic Squadron was 0.93; on those of the Pacific Station, 0.88; those of the Asiatic Station, 0.78; and for the receiving ships 0.64; the ratios for the previous years were 0.75, 0.67, 0.76, and 0.68, respectively.

The ships were withdrawn from the European and South Atlantic stations by reason of the war with Spain, and as a consequence statistics dealing with these stations were not received for the year 1898.

The admissions for general infectious diseases (nonvenereal) were in the ratio of 167.65, as against 127.17 for 1897; diseases of the nervous system, 92.24 (previous year 54.16); diseases of the digestive apparatus, 149.62 (previous year 112.91); diseases of the respiratory apparatus, 66.41 (previous year 51.04); and of venereal diseases and diseases of the genito-urinary apparatus, 91.47, as against 98.98 for 1897.

The statistical tables in connection with the force afloat give the number of deaths as 333, which includes the 260 men lost in the destruction of the *Maine*. These casualties, having been dealt with in the Surgeon-General's Report for 1898, would leave 73 deaths as the number occurring on all the other ships of the Navy during the year 1898, giving a ratio of 3.74 per 1,000, a slight increase over that for 1897 of 2.79 per 1,000.

The number invalided from the service was 122, a ratio per 1,000 of force of 6.26; for previous year, 4.83.

There were 2,790 transfers to hospital, giving a ratio of 143.30 per 1,000, as against 95.71 for 1897.

NORTH ATLANTIC STATION.

(*Statistics.*)

There were 117 cruising vessels employed on the North Atlantic Station, of which number 47 were put in commission for service during the war and were placed out of commission shortly after the termination of hostilities.

The mean force, corrected for time, was 13,555, and the total number of cases admitted to the sick list was 12,717, being in the ratio of 938.17 per 1,000. The ratio for the previous year was 806.74.

There were 307 deaths in this squadron during the year, which is inclusive of the 260 deaths occurring at the time of the destruction of the U. S. S. *Maine.*

This gives as the number of deaths reported from all the other vessels of the squadron 47; in the ratio of 3.46 per 1,000 of admissions to the sick list; for previous year, 2.17. The causes of death were as follows: Gunshot wounds, 12; drowning, 6; asphyxia, apoplexy, and remittent fever, 3 cases each; alcoholismus, appendicitis, dysentery, and wounds other than gunshot wounds, 2 each; and one case each of aneurism, broncho-pneumonitis, diabetes, embolism, fracture, intestinal catarrh, meningitis, nephritis, pneumonia, syphilis, typhoid fever, and yellow fever. The case of yellow fever occurred on the U. S. S. *Resolute* while at Dry Tortugas.

The principal diseases occurring on this station were: Malarial affections, 837 cases; heat prostration, 448; gonorrhea, 263; articular rheumatism, 194; syphilis, 193; typhoid fever, 72; phthisis, 55; pneumonia, 51; and dysentery, 48.

There was not a single case of smallpox admitted during the year, notwithstanding its prevalence in many of our own ports, as well as those of Cuba and Porto Rico.

PACIFIC STATION.

(*Statistics.*)

There were 14 cruising vessels on the Pacific Station in the year 1898. The mean force corrected for time was 1,372, and the total number of admissions to the sick list 1,208; a ratio of 880.46 per 1,000 of strength. The ratio for the previous year was 667.85.

Only 3 deaths occurred among the vessels of this squadron during the year, the causes being one case each of pneumonia, epilepsy, and poisoning. The case of poisoning was that of a man attached to the *Mohican*, who committed suicide by taking laudanum.

The ratio of deaths per 1,000 of force was 2.18, as against 2.56 for the previous year.

The principal diseases causing admissions to the sick list were malarial affections, 75 ; articular rheumatism, 22 ; syphilis, 21 ; denguis, 13 ; gonorrhea, 12 ; phthisis, 9, and pneumonia, 5.

There was only one case of typhoid fever reported from this squadron during the year.

ASIATIC STATION.

(*Statistics.*)

This squadron was composed of 11 vessels, the mean force of which, corrected for time, was 2,188. There were 1,714 admissions to the sick list, giving as the ratio per 1,000 of force, 783.36 ; which for the previous year was 667.85.

The vessels of this station reported 13 deaths during the year, a mortality of 5.94 per 1,000 of force ; for previous year, 3.08.

The causes of death were as follows: Drowning, 5; dysentery, 2; and 1 each from apoplexy, gunshot wound, hepatitis, intestinal obstruction, smallpox, and typhoid fever. The death from smallpox occurred in the marine guard detailed for duty at the United States legation at Pekin, China.

NAVY-YARDS, MARINE BARRACKS, AND OTHER SHORE STATIONS.

Statistics.

The various navy-yards and other shore stations had a mean force during the year of 3,173.

The total number of admissions to the sick lisk was 2,714, a ratio of 855.34 per 1,000. The ratio for the previous year was 880.94.

The more important diseases of a general infectious character treated during the year were as follows: Malarial affections, 299; articular rheumatism, 55; measles, 23; yellow fever, 23; pneumonia, 16; dysentery, 13, and typhoid fever, 4.

Seven persons were invalided from the service, 3 by reason of venereal diseases, 2 each for asthma and local injuries, and 1 for epilepsy.

The deaths numbered 18, the causes being as follows: Killed in action, Guantanamo, Cuba, 6; pneumonia, 3; valvular disease of the heart, 2, and one case each from appendicitis, meningitis, nephritis, peritonitis, phthisis, and typhoid fever.

The death ratio per 1,000 of force was 5.67, as against 6.21 for the previous year.

A most remarkable instance of comparative immunity from disease was presented in the reports from the Marine Battalion, North Atlantic Fleet, where a force of 588 officers and men during the period from April 22, 1898, to September 20, 1898, fifty-six days of which time (the date of landing was June 10) was spent at Guantanamo, Cuba, subject to attacks from the Spaniards, only gave a record of 210 admissions to the sick list with 1,614 sick days.

There was not a single death in the battalion from disease; the mortality rate coming entirely from casualties of battle.

Of diseases of a general infectious nature there were 25 cases of malarial affections, 8 of dysentery, 3 of pneumonia, 12 of measles, and 3 of acute articular rheumatism.

There was not a single case of typhoid fever reported.

The principal diseases causing admission to the sick list were malarial diseases, 117 cases; syphilis, 71; heat prostration, 41; articular rheumatism, 30; gonorrhea, 23; phthisis, 9; dysentery, 7; typhoid fever, 7; and pneumonia, 3.

RECEIVING SHIPS.

(*Statistics.*)

The receiving ships had a mean complement during the year of 2,354, an increase over that for 1897 of 1,163. The total number of admissions to the sick list was 1,516, a ratio per 1,000 of force of 639.76; for previous year, 683.52.

The *Vermont* had the largest number of admissions, 590 in a force of 786.

There were 9 deaths during the year, giving a ratio per 1,000 of force of 3.82.

The deaths, distributed on the various ships, were as follows: Five on the *Vermont*, causes, 2 from alcoholism and one each from angina pectoris, nephritis, and septicæmia; 2 on the *Wabash*, causes, 1 each from drowning and multiple fractures; 2 on the *Franklin*, the result of drowning.

There were no deaths on the *Richmond* and *Independence*.

The receiving ships transferred 489 patients to hospital, and invalided from the service 24 cases.

SELECTED MEDICAL, SURGICAL, AND SANITARY NOTES FROM SHIPS, SHORE STATIONS, AND HOSPITALS.

[Casualties of battle, occurring in the war with Spain, appear in report of previous year.]

SHIPS.

U. S. S. AMPHITRITE.

(Note.)

Henry G. Beyer, *Surgeon.*

Urethræ ruptio.—On March 15, at 7 a. m., a boatswain's mate, second class, aged $24\frac{5}{12}$ years, while washing deck, attempted to move a small boat by pulling a rope attached to its bow. The deck being wet, his feet slipped from under him, and he fell with considerable force astride the sharp edge, striking the scrotum and perineum. He soon recovered from the shock and continued on duty, not reporting to the medical officer for four hours.

An examination disclosed moderate swelling and a greenish discoloration an inch wide extending from the scrotum to the anus. A soft catheter failed to enter the bladder, and on withdrawal contained blood, a few drops of which also escaped at the meatus. A compress was applied and rest in the horizontal position secured.

Fourteen hours after the accident, the bladder being distended, no urine having passed, another attempt was made to pass a catheter, but without success, only blood being withdrawn. The compress was re-applied and the case closely watched.

On the following morning there was a marked swelling and discoloration of the penis, scrotum, perineum, and buttocks. The scrotum measured 21 inches in circumference, and the perineum, extensively swollen and discolored, formed with the scrotum a continuous mass, extending to the anus and into the buttocks and thighs. The entire field was a deep purple or violet. The bladder was now very much distended.

Under ether, and after the usual preparations, an incision about 2 inches long was made in the median line to within three-fourths of an inch of the anus. The grooved sound in urethra could not be felt until the incision had a depth of 2 inches. The tissues were thoroughly infiltrated with dark blood mixed with urine constantly escaping from the bladder. When the point of the knife reached the groove, its distance from the edges of the wound was $2\frac{1}{2}$ inches. An attempt to pass a soft catheter through the wound into the bladder was unsuccessful, but after cleansing with a weak solution of bichloride, conducted by a catheter within the urethra, a metallic instrument was introduced into the bladder through the wound, and after a large amount of clear urine was evacuated, secured in position by a packing of iodoform gauze. The operation lasted three-quarters of an hour. The swelling and œdema rapidly disappeared. The urine collected from the catheter in the perineum was normal in appearance and quantity. It was removed on the fifth day, and another introduced by the urethra. This was secured with tape and outside dressings, and the urine collected by soft rubber tubing.

On March 22 three shots, fired from the 10-inch gun in the forward turret close to the sick bay, caused the catheter to enter the perineal wound. It was replaced at once. A uniform rise and fall in temperature was noticed while the catheter remained in the bladder. In the evening the fever rarely exceeded 101° F., while in the morning a few tenths above the normal was the rule.

On March 26 the catheter was removed. The temperature remained normal during the day. Six ounces of urine passed by urethra and the remainder through perineal opening.

Early in April all the urine was passed by the natural channel. The patient rapidly improved until he was discharged to duty well on April 22.

U. S. S. BADGER.

(*Note.*)

M. S. Simpson, *Passed Assistant Surgeon.*

Fractura.—On August 26 a coxswain, aged $20\frac{5}{12}$ years, fell from the main topmast, breaking the after awning support and striking the deck. Death occurred one hour after injury. The eleventh and twelfth dorsal vertebræ, third, fourth, and fifth ribs on left side, and third and fourth on right side, were fractured. The liver was ruptured and right lung penetrated.

U. S. S. BALTIMORE.

(*Note.*)

John C. Wise, *Medical Inspector.*

Erysipelas.—An apprentice, first class, aged $20\frac{5}{12}$ years, was admitted March 30 with erysipelas of right leg, knee, and thigh. The joint was distended with effusion and the superficial lymphatic vessels and veins appeared as red lines. The disease rapidly spread. The temperature ranged from 102° to 105° F., and there was slight delirium.

On the second day attention was attracted to the lungs, and on the third there were bloody expectoration and the physical signs of pneumonia; lower lobe, left side.

Incisions $1\frac{1}{2}$ to 3 inches long and extending to the deep fascia were made on inner side of knee, popliteal space, and outer side and back of thigh and leg. The slough extended from outer side of ankles to the pelvis and involved nearly the whole circumference of limb. The use of the knife and moist antiseptic dressings caused rapid separation of slough. The general treatment was tonic and supportive.

On April 11, the temperature being normal and nearly all slough removed, the patient was transferred to the United States Naval Hospital, Yokohama. At that time he had fully recovered from pneumonic trouble. On May 21 recovery was complete, and when opportunity occurred he was returned to his ship.

Epilepsia.—During the morning watch of June 9 a coxswain, aged 26½ years, accosted the officer of the deck with the following remark: "You would have me shot, would you?" He then, in a few minutes, had a violent convulsion, without complete loss of consciousness. The attacks recurred every few minutes, and in the intervals the mind was clear. During the attacks the pulse rate was about 140 and the respiration labored. The opisthotonos was pronounced. The temperature ranged from 98 to 101° F. During the intervals the pulse was 76, and he was tractable and able to take food and medicine. The treatment consisted of restraint, nourishment, and bromide of potassium with chloral hydrate.

The convulsions continued for five days, the smallest number of attacks for any day being 19.

He was transferred to naval hospital, and eventually invalided from service. There was history of a similar attack three years before.

U. S. S. BOSTON.

(*Note.*)

M. H. Crawford, *Surgeon.*

Plague.—There were 6 cases of bubonic plague reported in Hongkong in January, 1898, 65 in February, and 153 in March. The total number of deaths from that disease during the same period was 195. The origin of the outbreak was obscure. The first case was reported in October, 1897, and there were 4 cases in November and December. The sanitary board ascribed the epidemic to the large influx of visitors at the time of the races, in February.

Canton has no sanitary board and no system of death registration. Plague existed at Canton, Swatow, Amoy, and Macao. All of those cities have communication by steamer with Hongkong, and there was no system of medical examination on arrival. Many cases of plague occurring in Hongkong are not reported to the sanitary board, as the Chinese are much opposed to treatment by foreign doctors. The police recovered bodies from the harbor, representing deaths from that disease.

The treatment now employed is almost entirely symptomatic and prophylactic. Dr. Lawson, who is in charge of the hospital where the cases of plague are treated at Hongkong, administers an initial dose of calomel, and follows it with hydrar. bichlor. gr. 1/15, tr. cinchon. comp. drachm 1, every four hours. Ammonia, brandy, and strychnine are freely employed, and the diet is milk.

After a long experience, he states that Yersen's antitoxin treatment has not proved efficacious.

Variola.—During January there were 54 cases of smallpox in Hongkong, with 31 deaths. In February and March there were 125 cases.

U. S. S. BROOKLYN.

(*Note.*)

P. FITZSIMONS, *Medical Inspector.*

Diarrhœa.—While the ship was at Guantanamo Bay there occurred in twenty-six days 57 cases, classified either as febris ephemera or diarrhea simplex, though they were probably all the same disease. That is, the diarrhea, when treated with cathartics, would quickly subside; otherwise it would be complicated with fever. The fever was not influenced by quinine, but was promptly reduced by cathartics. Three days was the average time a case was treated.

Slight ptomaine poisoning would fully account for the prevalence of the affection, and it is thought that changes in the meat, incident to the climate, and delay before cooking after removal from the refrigerator ship, or exposure of the meat in New York during delivery, may have had a causative relation.

U. S. S. CINCINNATI.

(*Note.*)

J. C. BYRNES, *Surgeon.*

Vulnus sclopeticum.—On May 3, while a portion of the crew were drilling in the starboard gangway with the 6-mm. rifle, and using, it was supposed, only dummy cartridges, one piece was fired, a clip of live cartridges having found its way among the dummies. The projectile passed through a three-eighths-inch steel door of the after ash-hoisting compartment and entered the mouth of a shipwright, who was going forward in the port gangway, producing a compound comminuted fracture of the lower jaw. It then struck a half-inch steel plate, making an indentation of nearly one thirty-second of an inch. The bone was fractured through the angle, and 2 inches of the inner side of the alveolar process was splintered. The three left lower molar teeth were broken from their attachments; the second, driven through the wound, fell to the deck. The second and third upper molars were broken into fragments. The fact that the projectile entered at the mouth without injuring the lips, incisors, or tongue is a striking feature of the accident. The lips and tongue were not even scorched by the bullet in its passage to the point of impact within the buccal cavity.

The treatment in hospital continued until November 1, and was complicated by the existence of a sinus that healed slowly. He was finally invalided from service on account of the stiffness following the accident.

Catarrhus epidemicus.—This disease prevailed on board when the ship was at Norfolk, in June. The first cases appeared when in the dry dock. The febrile state was followed in many instances by subnormal temperatures, varying from one-half of a degree to one and a half. There were 68 cases. The first were marked by a chill, headache, coryza, general muscular soreness, cramps in the bowels, nausea, in some instances vomiting, and temperatures at times as high as 105.5° F. Some started with a subnormal temperature, and this was followed by a rapid rise, persistent in character. Later in the epidemic bronchitis, profuse serous diarrhœa, and profound nervous prostration, with symptoms of disturbed circulation, became additional features. The disease was quite prevalent at Norfolk.

U. S. S. COLUMBIA.

(*Note.*)

C. G. HERNDON, *Surgeon.*

Febris enterica.—On July 8, 318 officers and men of the Sixth Illinois Volunteers were received on board at Charleston, S. C., for transportation to Guanica, Porto Rico. They had been at Camp Alger for several weeks, and were on board the *Columbia* for seventeen days. The addition of 318 persons crowded the ship to such an extent that fully 50 per cent of our own crew were unable to sling their hammocks, and had to sleep around on the decks. The medical officer of the Army who accompanied the battalion stated that there were a few cases of bilious and malarial fever occurring among his men, but denied that any case presented symptoms of typhoid. However, on August 3, nine days after the battalion disembarked, typhoid fever appeared on the ship. There were 13 cases in all, and the most thorough search failed to find anything about the ship, water, or rations to account for the outbreak. Eight of the cases occurred among the coal passers and firemen, who, probably on account of their exhausting duties, had their resistance lowered. It is believed that the cases of fever among the troops were incipient typhoid, and that their presence on board was responsible for the poison which caused the outbreak.

U. S. S. CONSTELLATION.

(*Note.*)

G. B. WILSON, *Passed Assistant Surgeon.*

Catarrhus epidemicus.—The crew of this vessel, stationed at Newport, R. I., suffered from an epidemic of this disease during the month of December. With an average complement of 600, there were 262 cases, but only 15 were of such severity as to necessitate admission to the sick list. The majority were under treatment for from twenty-four to thirty-six hours only.

U. S. S. HELENA.

(*Note.*)

M. S. GUEST, *Passed Assistant Surgeon.*

Vulnus sclopeticum.—When a seaman, aged 25 years, was serving, on April 24 as a member of a prize crew, his revolver, falling out of the holster and striking the deck, was discharged. The bullet entered his right hip in an upward, forward, and inward direction. As the probe could not be introduced more than 2½ inches, it was thought that the projectile, though not felt, had lodged above and posterior to the acetabulum. The shock was severe and complaint was made of pain in front of abdomen and on the right side as high as the liver. Vomiting occurred from time to time, of original contents of stomach and bile, but there was no appearance of blood or of intestinal hemorrhage.

Under treatment, the patient reacted in about an hour and hypodermics of morphia were given to relieve the pain.

As the ship was at Key West, he was transferred to the marine hospital at that place, where another attempt was made to locate the bullet, without success. Death occurred at 2.20 a. m., April 25.

The autopsy made at the marine hospital by Dr. Guiteras of that service, eight hours after death, showed: Gunshot wound of right buttock, about 10 centimeters back of the great trochanter; a probe passed without difficulty for about 30 cm. in the direction of the superior spinous process of the ilium; no wound of exit visible; on removal of dressing about 25 cc. of dark blood issued from the wound. The organs of thoracic cavity were normal; lungs and heart with less blood than usual. The abdomen was tense, and on opening the cavity, which contained 1,500 cc. of blood, a large amount of gas escaped. On the left side of great omentum was an extensive blood clot. The intestines: Distended with gas; the peritoneal covering injected; transverse colon black from ecchymosis; cæcum much injected; ascending colon perforated and filled with blood, and the tissues for a considerable distance about the perforation swollen and ecchymosed; perforation of small intestine about the middle. The right psoas muscle, about 10 cm. above the brim of pelvis, showed an oval opening about 2 cm. long and 1 cm. wide leading into a channel extending downward, backward, and outward. About 7 cm. from the opening the iliac portion of os innominatum was perforated, the hole being 1 cm. in diameter, with jagged edges and numerous small pieces of bone filling the wound leading to the abdominal cavity.

The projectile was found lying loosely against the left side of the abdominal cavity. It was flattened, twisted, and jagged.

U. S. S. HELENA.

(*Note.*)

LEWIS MORRIS, *Passed Assistant Surgeon.*

Melancholia.—On December 16 a chief yeoman, aged $28\frac{3}{12}$ years' who for some months had been eccentric and unsociable, was admitted to the sick list with mania. On December 20 he refused food of any kind, and would attempt masturbation whenever possible. The use of the straight jacket was then required until the 24th. He improved steadily until the 30th, when there was a short relapse. After treatment in naval hospital for some months he was transferred to the Government Hospital for the Insane.

U. S. S. INDIANA.

(*Note.*)

N. M. Ferebee, *Surgeon.*

Febris enterica.—On December 10, 1897, a lieutenant, aged $34\frac{6}{12}$ years, was admitted to the sick list with catarrhus epidemicus. At the time that disease was quite prevalent on the ship. He complained of frontal headache, anorexia, constipation, and slight abdominal and various muscular and articular pains. At the time of admission his temperature was 103.6° F. Under a calomel purge, and doses of quinine and antipyrin, all symptoms decreased, and his appetite and strength were gradually returning, so that on the morning of December 15, when his temperature was 99° F., he said that he felt practically well, and was desirous of getting up. His request was not complied with, and treatment with small doses of antipyretic was continued. In the early part of the same afternoon he was violently delirious, and had to be restrained by force. The temperature was 101.6° F.; pulse, 104, feeble and intermittent; respiration rapid and shallow; face flushed and expression dull; tongue heavily coated; abdomen slightly distended and sensitive to pressure, with tenderness and gurgling marked in right iliac fossa. There were also a few rose-colored macules about the upper region of abdomen that disappeared on pressure. The source of infection could not be satisfactorily ascertained.

Under morphine and atropine some sleep was obtained. Subsequently calomel and enema were given. The cold sponge bath was used whenever the temperature reached 103° F. and peptonized milk and whisky were given as required. Whenever the heart's action seemed to require it strych. sulph. gr. $\frac{1}{20}$ was used hypodermically. At times when the tongue was dry and fissured ol. terebinth. in gtt. V doses was administered until the tongue become moist.

From December 16 to 22 the temperature ranged from 100 to 103.2° F. and there was more or less delirium and nausea. On the 19th a profuse intestinal hæmorrhage occurred, and heat and stimulants had to be freely employed to prevent collapse.

From December 22 to December 27 the temperature did not exceed 103° F., but the heart was rapid and feeble. From December 27 to 29 a series of chills occurred at intervals of twelve hours, each accompanied by a rise of temperature and a subsequent fall, during which stimulants had to be freely employed. On one occasion the temperature during the chill reached 105° F. and fell within an hour to normal. The pulse remained at 120 and very weak. Very slight chills of short duration occurred during the next four or five days. The severe chills were accompanied by nausea and vomiting. Each was followed by a profuse perspiration. The delirium continued during the first half of the illness. On January 27 the patient had fully entered upon convalescence. Constipation continued throughout the illness, and the peculiar temperature curve and the chills occurring at regular intervals are marked features of the case.

U. S. S. IOWA.

(*Note.*)

M. H. Simons, *Surgeon.*

Effects of powder fumes in battle of July 3.—It was noticed that the fumes from the guns during the battle of July 3 caused tonsilitis, bronchitis, and rhinitis. The new powder fumes have an acid odor and are irritant to the throat and air passages. The concussion also caused several cases of more or less complete deafness. The inflammation caused by the fumes closed the Eustachian tubes, and the concussion apparently drove the air from the middle ear to such an extent that the tympanic membrane was depressed by atmospheric pressure. In three or four days, under inhalations from steam atomizer, the inflammation subsided. The balance of pressure being restored, the hearing returned, often suddenly. There were only a few cases of rupture.

Diarrhœa.—During the time the ship was off Santiago and Guantanamo, there were only 13 cases of diarrhœa on this vessel, though on some of the ships of the squadron there were many cases. The cases on this ship seemed to be due to overeating and drinking too much water. However, as the question of meat had been regarded by some of the medical officers as having a causative bearing, by advice the ice and meat were brought together from the supply ships and packed together as soon as possible in the cold-storage room. The meat was served out and cooked without unnecessary exposure to the atmosphere.

U. S. S. MARBLEHEAD.

(*Note.*)

A. R. Wentworth, *Passed Assistant Surgeon.*

Vulnus sclopeticum.—On January 12, when the ship was at Key West, Fla., and a portion of the crew were at target practice, six persons were injured by the accidental discharge of the new navy rifle.

A bullet entered the right arm of a seaman, about 3 inches above the elbow, shattering the external condyle of the humerus and fracturing the head of the radius, leaving the bone protruding through the wound. The muscles of outer side of arm were badly lacerated. A resection of the head of the radius was performed. On March 23, pronation and supination were not possible, but flexion and extension existed in a limited degree. Ultimately pronation was normal and supination existed to 45 degrees. The end of the radius tended to project somewhat on strong flexion of the fingers. The limb, however, was quite strong and he was able to lift fairly heavy weights. There was some atrophy and slight deformity. As, however, he was unable to pull an oar, or perform any severe labor involving the use of the arm, he was invalided from service on May 5. At the time of the injury there was some doubt whether the limb could be saved.

Five other persons were injured at the same time by another bullet which passed through the brass rim of a deck ventilator half an inch thick. Multiple injuries were produced by the flying fragments, but were not considered of much severity.

Diarrhœa.—During the month of August, and while off Caimanera, Cuba, there was an epidemic of diarrhœa on board. Only 16 cases required admission to the sick list. The disease was apparently caused by atmospheric changes and sudden chilling. The symptoms were almost those of catarrhus epidemicus. The temperature ranged from normal to 104° F. There were muscular pains, malaise, and frequent watery movements. The duration was from four to ten days, but convalescence was rapid.

Fames.—About the middle of August, when the ship was off Caimanera, Cuba, it was learned that many families who had retired during the bombardment to the outlying plantation of the English consul were starving. Investigation disclosed a most pitiable state of affairs. Until the departure of the ship, on September 1, food and medical and surgical aid were given to about 125 patients daily. Among the women and children malarial troubles and the sequellæ of starvation were common. Measures for more permanent relief were established, and at the time of our departure the results were most satisfactory.

U. S. S. MARIETTA.

(*Note.*)

George Rothganger, *Passed Assistant Surgeon.*

Prostratio thermica.—In March, a landsman, aged $22\frac{2}{12}$ years, was brought out of the fire room with severe cramps in the legs and abdomen. In spite of a hypdermic of morphia, the cramps increased in severity and extent until there was opisthotonos. Chloroform inhalation was employed with success. The rectal temperature was 103.2° F. Under chloral hydrate and potass. bromid. given by enema, sleep was secured, but in less than two hours, the old condition returned, and inhalations of chloroform were given for an hour and the enema repeated. He then slept quietly for three hours or more, when there was a slight return, requiring an additional dose of chloral. He slept well during the night. He remained on the sick list twelve days before he was able to do duty.

U. S. FLAGSHIP NEW YORK.

(*Note.*)

C. U. Gravatt, *Medical Inspector.*

Vulnus sclopeticum.—On April 28, ship at sea, an apprentice, 1st class, aged $19\frac{7}{12}$ years, was shot by the accidental discharge of a navy revolver. The projectile entered the inner upper portion of right forearm, injured the ulnar nerve, came out at the lower inner portion of the right arm, entered the peritoneal cavity, through the right loin, injuring the mesentery, proceeded upward and to the left, pierced the diaphragm, went through the left lung and lodged in the armpit on the left side. In an hour and a half after the accident, when there was reaction from shock, the abdomen was opened and the intestines examined. No wounds of the gut were found. Considerable blood in clots was removed from the peritoneal cavity, and the wounds in mesentery sutured. As the bleeding had ceased and there were no other signs of damage to the abdominal organs, the incision was closed.

There was slight hæmoptysis on the first day, but afterwards the lung gave no signs of injury.

On May 2 he was transferred to hospital. At no time was there a serious symptom. Convalescence was uninterrupted.

Adenitis inguinalis (venereal).—In two cases the glands were removed. Wounds were closed, silver wire being used for sutures. Recovery was rapid in each case, fifteen days being the time on sick list.

U. S. FLAGSHIP OLYMPIA.

(Note.)

A. F. Price, *Medical Inspector.*

Plague.—The bubonic plague was present at Hongkong when the ship arrived there on February 17, and the number of cases was increasing daily in spite of the isolation of sick and energetic disinfection of houses and personal effects. The record was as follows: January 8, 2 cases; January 15, no case; January 22, 2 cases; January 29, 2 cases; February 5, 5 cases; February 12, 5 cases; February 19, 9 cases; February 26, 47 cases; March 5, 22 cases; March 12, 16 cases; March 19, 30 cases; March 26, 42 cases; April 2, 42 cases; April 9, 106 cases; April 16, 97 cases; April 23, 127 cases. It appears that during May and June the epidemic reached its highest point, about 40 cases daily. Quite a number of fatal cases occurred among non-Asiatics. The disease is extremely fatal in the Chinese, the mortality being from 85 to 95 per cent. It is thought that the rate of mortality is somewhat lower in Europeans. There was a severe epidemic of this disease at Hongkong in 1894, and a more serious one in 1896. The disease in each of those years was comparatively limited in extent until Apri or May, when it assumed an epidemic form and lasted until about the end of June.

Febris remittens.—There were 40 cases of continued fever on board during the second, third, and fourth quarters, classed as febris remittens. The fever, however, was peculiar and not affected by quinine. Abdominal symptoms were also slight or absent. There were prostrations, loss of flesh and strength, temperature ranging to 104° F., loss of appetite, and slow convalescence. The duration of attack varied greatly. Chlorine water gave good results. Quinine and strychnine were very useful during convalescence.

Morbilli.—Four cases of measles occurred on board between April 8 and 26. It was thought that the infection was conveyed by Chinese allowed on board during meal hours.

U. S. S. OREGON.

(Note.)

P. A. Lovering, *Surgeon.*

Fractura.—On June 26, on board the U. S. S. *Abarenda*, an ordinary seaman was struck by a falling derrick when the ship was getting under way. The right clavicle was broken about the middle in two places, and the left near the outer third. The right leg was dislocated outward at the kneejoint and there were two deep cuts on lower lip and chin and several shallow ones on the right arm. The shock was only moderate and there was no sign of internal injury, though the derrick fell across the body. The fractures were treated with a modified Sayres dressing, the dislocation was reduced, and a position splint applied. The fractures united well and there was a good result at the kneejoint. However, a sufficient amount of stiffness of the joint remained on September 19 to prevent his performing the duties of the rating, and he was therefore invalided from the service.

U. S. S. PANTHER.

(Note.)

W. F. ARNOLD, *Passed Assistant Surgeon.*

Dysentery.—A landsman, $24\frac{10}{12}$ years of age, was admitted on December 20 with amœbic dysentery, considered to be due to infection on shore when on liberty three weeks previous to attack. Practically all the amœbæ observed in the case were either dead or capable of only the most sluggish movements. Many of them contained red blood corpuscles. At the outset the symptoms were very severe, but the tenesmus was controlled by a few injections of a solution of tannin, 1:250, and full doses of washed sulphur. He was able to resume his duties in a week. This plan of treatment has been employed with considerable success in similar cases in Cuba. It has caused no other inconvenience than most malodorous stools. The combinations in the intestines appear to disinfect the rectum. The rectal mucus shows many particles of the drug after twenty-four hours.

U. S. FLAGSHIP PHILADELPHIA.

(Note.)

DWIGHT DICKINSON, *Medical Inspector.*

Hernia.—A landsman, aged $21\frac{6}{12}$ years, was assisting in coaling ship on August 17. He stood on a coal lighter alongside and caught empty baskets as they were tossed from the ship to be refilled. Failing to catch one of the baskets, he received a violent blow in the abdomen, the handle striking him in the mid line half way between the ensiform cartilage and the umbilicus. He became dizzy and had some nausea and experienced considerable pain. These symptoms, except the pain, soon subsided and he resumed work. He did not report at sick call until August 30, when a flat elliptical tumor was found at the seat of injury. It was about 3 inches long and 2 wide and was most prominent when standing. It partly disappeared in the recumbent position and when the hands were over the head there was marked gurgling over the tumor on coughing. The size of the tumor and the pain were greatly increased by a hearty meal or on lifting. The diagnosis was rupture of the abdominal wall with partial hernia of omentum and pyloric end of stomach. He was ultimately invalided from service.

Vulnus punctum.—On August 13 a seaman, while skylarking with a shipmate, received on inner side of left wrist a small punctured wound from the blade of a pocketknife. There was considerable hemorrhage and severe pain. One suture was put in and the wound treated antiseptically. It healed readily. Soon after the accident it was noticed that sensation was lost along the inside of hand, the little finger and inner side of third finger. By November not only was sensation completely lost over the area mentioned, but motion of all the fingers was impaired. All the muscles of the hand were wasted and there was paralysis of the third and fourth fingers. On November 24, under ether, a free incision was made and the severed ulner nerve exposed. The ends, which were held in line by new connective tissue, were disentangled and freshened, and the continuity was restored by small flaps from each end. Sterile silk sutures were used. The wound healed promptly. Sensation was partly restored in twenty-four hours. It was ultimately completely regained, as were also the motion and restoration of muscles.

U. S. S. PURITAN.

(*Note.*)

J. D. Gatewood, *Surgeon.*

Bradycardia.—On September 16 a coal passer, aged 22 years, was awakened by a comrade, who noticed that he was losing blood in large quantity. It appears that, coming off watch at midnight, the ship at sea, and feeling much exhausted by the work in extreme heat, he had gone to sleep on the lower deck, where two hours later he had a profuse epistaxis, the flow continuing during sleep and until the head was elevated. When he reported to the medical officer the pulse rate was 100 and he was pallid and weak. During the day he slept a great deal, and in the afternoon complained, on inquiry, of slight precordial pain and an aching sensation in the small of back. No urine had been passed and constipation of several days' duration continued. The respiratory sound was normal. The heart appeared to be somewhat enlarged, its action very slow, strong, and labored, and the first sound very much diffused. The pulse rate was 43, but regular. There was no murmur and no sign of aortic enlargement. Some weeks prior to present trouble he had complained of precordial pain, but an examination had been negative. At that time the pulse rate was normal, but the heart action was somewhat labored.

According to his statement, he had been injured two years before by having been jammed in a stable door by cattle. The injury was on left side of chest, and he had been unable to do any work for two months. The accident, he was sure, had its effect upon the heart, causing it to give a blowing sound audible some little distance away. The sounds continued for two months, he said. There was no external evidence of injury at time of admission. On this vessel, during the six months of his enlistment, his duties were usually severe, as the ship was cruising in the tropics, and at times the fireroom temperature was over 170° F. Besides, being a small man, he was utilized to scale boilers from time to time, that, owing to the exigencies of the service, were still warm. No such duty had, however, been performed for two weeks prior to his admission to the sick list.

Under small doses of potass. et sodii tartras, the pulse rate was increased to 52, and there was a small amount of urine passed. The excretion had a specific gravity of 1.031 and was cloudy, but free from albumen. Calomel and caffeine increased the flow, and there were several small stools. But the pulse rate varied from 32 to 52 until September 21, when he was transferred to hospital. On that day there was a slight epistaxis, immediately controlled by position. At that time it was thought not improbable that the case was one of fibroid heart changes associated with the slow pulse occasionally marking an exception in such cases.

In hospital there was slight epistaxis on October 1, and little or no change until October 26, when the pulse rate was for a very short time 112. Prior to that date it was usually 50, and subsequently it varied between 40 and 112, until on November 26 it was noted that the average was 60. On November 29 he was discharged to duty on the receivingship. There is no record of trouble since that date. The treatment was the continued use of small doses of whisky.

Fractura.—On September 3, when the ship was coming to anchor, an apprentice, second class, aged 17 years, was at work on berth deck. The swivel of the hook of standing part of catfall broke and he was struck on the left ankle. An aggravated Pott's fracture was produced, with very marked eversion of the foot and dislocation. The parts were adjusted, under ether, and a temporary dressing, composed of well-padded felt splint shaped to leg and ankle, was applied. On September 9 a Bavarian dressing was utilized, but owing to subsidence of swelling and weight of plaster that was removed on September 13 and a plaster crinoline dressing substituted. The foot was in excellent position. He was able to spend much of the time on deck during the voyage at sea. On September 21 he was transferred to hospital, where a very good result was secured. He was discharged to duty in May.

U. S. S. RALEIGH.

(*Note.*)

E. H. Marsteller, *Surgeon.*

Œdema, angio-neurotic.—The first attack was in the early morning hours, when the patient was awakened by a burning pain in the left middle finger. There was a small red spot on the side of the finger resembling the bite of an insect. Within a few moments a similar spot appeared on the right wrist. Both localities gradually swelled until a dusky red œdema occupied the entire thenar eminence and first three fingers of the left hand and the whole wrist of the right. Itching, burning, and stiffness were the subjective symptoms. The œdema gradually subsided and in eighteen hours had disappeared. Two nights afterwards the right elbow, hand and knee, and left thigh were the seats of a similar swelling, but except on the hand there were giant wheals, such as appear in urticaria tuberosa. For a period of two weeks the disturbance was present every other night, appearing sometimes on the right and sometimes on the left extremities. Occasionally the whole hand or foot, but more often one or two digits, were affected, and frequently giant wheals would appear on extremities or body. The face was the last to swell, once beginning on the right side of lip and extending until the whole lip and right molar region were very much enlarged. On another occasion the entire left side of the face became enormously swollen, closing the left eye and not subsiding for two days. During the second week of the disease there was, on the night of attack, a temperature of 102° F. During the fever there were chilly sensations, vertigo, headache, coated tongue, and irritability.

The relation between angio-neurotic œdema and urticaria was well marked in this case.

The cause was not determined. The patient was unusually well at the time of the first attack and was in training for an athletic contest. Diet did not have any effect in preventing attacks. Saline purgatives served only to weaken. The disease disappeared as suddenly as it had appeared.

Febris remittens.—During the first month after the arrival of the ship in Manila bay nine cases occurred, that were classed as febris remittens. These were characterized by sudden onset; fever rising at once to 103–105° F., throbbing headache, with congested conjunctivæ and face; vomiting, with or without epigastric pain; coated tongue, white and moist at first, but becoming dry and brown; early prostration, and violent lumbar rhachialgia. Black, watery stools, accompanied by much flatus, occurred early and lasted four or five days. Violent delirium, with convulsions, occurred in one case.

In several of the cases there was a fine macular rash, purpuric in character, which lasted several days. The rash was diffuse in one case, but in two others it occurred in patches. The ship was always offshore a mile or more, and quinine seem to have no controlling influence. Seven of the nine cases had been sleeping on deck every night, where there was a heavy dew.

There were no recurrences. The convalescence was slow in all cases.

U. S. S. SAN FRANCISCO.

(*Note.*)

A. C. H. Russell, *Surgeon.*

Meningitis.—On May 15, a musician, second class, aged 23, was admitted to the sick list with erysipelas. The inflammation spread over upper part of left cheek, the left temple, and the scalp above and back of the ear. The attack was initiated by chill and nausea. The temperature varied from 104.6° F. to normal on the morning of the 21st. The inflammation ran a mild course, and subsided under the continuous application, on lint, of ichthyol, 30 per cent in vaseline, and the administration of tr. ferri. chlor. and stimulants, with nourishing food. He was discharged to duty apparently well on May 29.

On June 1 he was admitted as with epilepsy. On May 31 he complained of sleeplessness, headache, nervousness, and left facial neuralgia. Temperature was normal. Skin over former erysipelatous area appeared flush, but showed no inflammatory infiltration. At 2 p. m. of same day, while asleep, he was seized with a general bilateral convulsion, preceded by a peculiar cry and followed by coma lasting an hour. During the convulsion face was first flushed, then cyanosed; tongue was bitten, and a bloody froth appeared on the lips. There were convergent strabismus and contracted, but equal, pupils. Consciousness was regained, and he was quite rational until 11 p. m., when a series of convulsions appeared, each similar to the first.

They recurred, at intervals of from ten to twelve minutes, until 5 a. m., June 1. Each convulsion lasted from thirty seconds to one minute, and was always bilateral. After 5 a. m. the convulsions occurred at longer intervals, and at 5.40 a. m. ceased. Up to the time of the loss of consciousness at 11 p. m. he had taken potass. bromid. gr. L. by the mouth; subsequently was given hyoscine hydrobromate gr. 1-100, potass. bromid. ℈ IV by rectum. At midnight the rectal temperature was 101.2° F., and at 4 a. m. 102.8° F. At 4.30 a. m. amyl nitrite was freely administered between the convulsions, without effect. Unconsciousness was still complete at 6 a. m. At 9.30 a. m. bowels moved freely by two enemas. In the forenoon (June 1) there were alternating periods of coma and delirium; during the latter he struggled to get out of the cot. Noon, temperature 102.4° F.; 8 p. m., temperature 101.6° F.; pulse 100 to 120. Toward evening the facial muscles on the right side twitched at intervals, but no general convulsion occurred. Ice compresses were applied to the head and counter-irritant to the nape of the neck. During the night the convulsive movements involved the eyes, which deviated to the right, the cervical muscles, the arm and leg of right side, the left side remaining passive. The pupils were equal. He could take no nourishment. In all the convulsions the body turned to the right side.

On June 2 condition was unchanged. He was unconscious and delirious at times. There were right unilateral convulsions at intervals of about fifteen minutes. He was unable to swallow. At that date he was transferred to the naval hospital, at which time there were deep coma and stertorous breathing at times. A part of head and face were purplish, the discoloration extending below left eye and including the eyelids, which were puffy. There was a little pus at the left inner canthus. Paresis involved the entire right side except during convulsions, which occurred every ten or fifteen minutes. Each convulsion began with the right external rectus, then the facial muscles were involved, then those of right side of neck and right arm, and at last right thigh and leg. They lasted from one to two minutes. The pupils contracted irregularly and quickly or dilated every few seconds.

The head was shaved and, together with the face, washed with solution bichloride. Ice bags were kept applied, and potass. bromid. given by rectum. Pus from eye showed quantities of B. lanceolat, with capsule, chains of streptococci, and ordinary cocci.

On June 3 there were pressure symptoms between convulsions, there being complete paralysis and loss of reflexes of entire right side except during convulsions. Temperature, 99.8° to 101° F.; pulse, 110 to 150. Whisky and milk during day and night; bromide in afternoon and night, 100 grains, by rectum; ice continued.

On the 4th there were no convulsions; after noon coma less deep; some voluntary movements on right side; pupils responded to light; bowels moved freely under salines.

On the 5th he was conscious and understood, but answered questions imperfectly. There were no convulsions and he was able to take milk. Complained of pain in left side of head, throat, and right arm. Milk, whisky, and bromide were continued. He continued to improve, and on August 1 was able to resume duty, no trace of disease remaining.

U. S. S. TEXAS.

(*Note.*)

CLEMENT BIDDLE, *Surgeon.*

Febris enterica.—An epidemic of typhoid fever occurred on this vessel. There were 17 cases in all. The first case appeared on October 11. The ship was then at the New York Navy-Yard; from that date until the 19th off Tompkinsville, and from October 21 to November 1 at Philadelphia. On November 3 the *Texas* was again off Tompkinsville.

Other cases occurred as follows: October 15, one; October 19, one; October 20, one; October 21, one; October 23, one; October 25, one; October 26, two; October 29, three; October 30, one; November 1, one; November 2, one; November 5, two. The average age of those attacked was 24½ years. In all, there was an unusually brief premonitory history, followed by headache, some diarrhea, and decided prostration.

Almost all the cases were furnished by three messes, in which fresh, unboiled milk had been in pretty general use. All the milk, it is stated, was obtained from one dairy in Brooklyn. The marines were exempt, and in their mess no milk had been served. No officer was attacked.

The last four cases were mild and were retained on board for treatment. The others were transferred to hospital. Two deaths occurred. The cases admitted from October 17 to 31 furnished the mortality. In those occurring before and after those dates the symptoms were less pronounced.

U. S. S. VESUVIUS.

(*Note.*)

JAMES F. LEYS, *Passed Assistant Surgeon.*

Contusio.—While a machinist, first-class, was working at a valve on the air-compressing machine, there was an escape of air under about 1,500 pounds pressure through a 1-inch opening directly against his face. He was braced against the machinery, or he might have been knocked down. A violent conjunctivitis followed, with swelling and discoloration around both eyes, which was much more marked on the second day. The patient had two "black eyes," and was incapacitated for four days. No foreign body was introduced. Recovery was complete.

U. S. S. VULCAN.

(*Note.*)

E. M. BLACKWELL, *Assistant Surgeon.*

Pemphigus.—A fireman, first class; native of Gloucester, Mass.; age, 26 years 6 months; enlisted in the United States Navy June 14, 1898.

According to his own statement, he contracted syphilis in 1891. There were ulcerated throat and bubo in right groin, and an eruption occurred a few weeks later. He was put upon specific treatment, which he continued for nearly a year, and he was apparently cured. He enlisted in the English navy soon after, and commenced excesses, etc., again, which caused a recurrence of the disease. Throat was badly ulcerated; buboes formed in both groins, which were lanced. A large abscess formed on the dorsum of the penis. He was compelled to leave the navy. He put himself under treatment and kept it up for about two years, taking iodide of potash and also tincture of chloride of iron regularly at intervals, with the result that he was apparently cured. He presented himself at sick call on board the U. S. S. *Vulcan* in Guantanamo Bay, Cuba, on July 16, 1898. Examination showed a whitish ulcer on right tonsil and a bubo in the right groin. He was put upon mixed treatment of bichloride of mercury and iodide of potash.

July 17: Throat was more ulcerated and bubo larger and more painful. An eruption of watery blebs had begun to show slightly about the genitals and perineum, and had increased enormously by evening. Pulse and temperature were normal.

July 18: Eruption all over the body, face, and head. Blebs, from size of a flaxseed to a penny, filled with a serous liquid, which became sero-purulent in about twenty-four hours, were all over the body. In both axillæ, about the genital and perineal regions, and on the inner sides of both thighs and upon both nates there was a confluent mass of watery blebs. The penis became œdematous, and the entire epidermis peeled off, leaving an inflamed raw surface, which the slightest irritation caused to bleed. There was slight phimosis; but when the œdema commenced there was paraphimosis. The back was thickly covered with large blebs, but they were not confluent. There was intense stinging and burning about the genitals and in the axillæ. Pulse, 72; temperature, 99.8°.

July 19: Many blebs had been opened and had dried up somewhat, leaving a deep bronze or copper colored, slightly elevated patch, with a tendency to bleed whenever the epidermis was torn off. Many new blebs had formed, and a good many in the mouth and around the eyes and on the scalp. Pulse, 72; temperature, 100.6°.

A medical survey was asked for. After examination it made a diagnosis of "pemphigus, nonsyphilitic in character."

July 20: There was some improvement. Some blebs were drying up and more forming.

July 21 to July 27: Patient improved considerably in this time. The blebs dried up to a great degree, and his condition became much better. At times he had severe pains in his joints and limbs and some headache. Some of the blebs became purulent, and in some there formed a hard gelatinous mass. Where the epidermis was torn off, the surface was very raw and inflamed, but soon became healthy. The œdema and paraphimosis of the penis disappeared. Temperature ranged from 101° to 98°, and the pulse from 70 to 90.

July 28 to July 31: He began to get worse on the 28th instant. Ulcers began to appear where the epidermis had exfoliated, and fresh blebs began to appear. His feet began to swell, and he began to lose flesh. Examination of urine gave negative results. Temperature ranged from 100° to 102.5°, and pulse from 80 to 100. Ulcers were forming where the blebs were, and the surface became very offensive. Pustules formed now instead of blisters. Over the sacrum there was a large number of confluent ulcers.

August 1 to August 4: There was no improvement. He became much weaker, suffered a great deal of pain, lost all appetite, and his feet and legs became very œdematous. His temperature ranged from 99° to 102°, and his pulse from 80 to 100.

August 5: Patient began to improve, and recovered rapidly until he was transferred to the U. S. S. *Solace* on August 12.

The line of treatment pursued was both local and systemic. He was given nutritious, stimulating food and six or eight ounces of whisky per day. Laxatives and cathartics were given as necessary. The following prescriptions were given, with slight variation, almost continuously: ℞ Tr. gentian co., Tr. cinchona co., Spts. Æth. nit., Ext. buchu fl. āā, fl. drachm one-half, thrice daily; and ℞ Tr. ferri chlor. mX Strych. sulph. gr. 1/60, thrice daily. Morphine, sulphonal, and the bromides were used as necessary to quiet restlessness and relieve pain.

The local treatment was as follows: He was bathed twice daily in tepid water and then sponged off with an antiseptic solution. He was then wrapped in absorbent lint saturated in one of the solutions, and oiled muslin put outside of that. The solution that gave the best results was that of boric acid, suggested by Dr. Berryhill, United States Navy. The blebs were all punctured and the liquid evacuated. In the axillæ, the groins, and the perineum, ointments of vaseline and boric acid, or vaseline and oxide of zinc were used with very good results.

From the U. S. S. *Solace* he was transferred to naval hospital at Chelsea, Mass., where he was under treatment for thirty-three days and discharged to duty October 1.

U. S. S. WHEELING.

(*Note.*)

William M. Wheeler, *Assistant Surgeon.*

Aneurysma.—An apprentice, second class, aged 18$\frac{1}{12}$ years, was injured on February 11 by a projectile from a Colt's automatic gun. The bullet struck the rail and, rebounding, entered the patient's thigh at the apex of Scarpa's triangle. The hemorrhage was profuse and from 16 to 24 ounces of blood were lost before a tourniquet could be applied. Later, when the tourniquet was slackened, no bleeding occurred. A compress was then applied. The wound healed in a few days, a few sutures having been put in. Strong pulsation over the seat of injury soon developed, and he was transferred to hospital, where he was still under treatment at the end of the year.

SHORE STATIONS.

NAVY-YARD, MARE ISLAND, CAL.

(*Note.*)

J. R. Waggener, *Surgeon.*

Urethræ strictura.—Internal urethrotomy was performed in three cases. Cocaine was used as the anæsthetic in 4 per cent solution. A good result was obtained in each case. Average time before discharge to duty was seventeen days.

NAVAL ACADEMY.

(*Note.*)

George E. H. Harmon, *Surgeon.*

Intestini ulcus (*Peritonitis*).—A blacksmith, aged 45$\frac{8}{12}$ years, when in apparent good health, was suddenly seized, on the afternoon of March 26, with a severe rigor lasting two hours, and with acute abdominal pain. As he had a home in the city of Annapolis and was there at the time, he was attended by a civilian physician. On the evening of the next day, at 6 o'clock, a medical officer of the station was called in. The patient was in a state of collapse, with rapid, weak, and wiry pulse, and the body covered with cold sweat. The abdomen was distended and tympanitic. In spite of the application of dry heat and stimulation, death occurred at 8 p. m. Necropsy (twenty hours after death); Rigor mortis marked; abdomen much distended and tympanitic and its opening marked by escape of fetid gas; no general peritoneal adhesion; recent deposits of coagulated lymph between coils of small intestine, omentum, and parietal peritoneum; peritoneal fluid increased in quantity and turbid; small intestine empty, distended with gas, and deeply congested for some 6 or 8 inches near the junction of the upper and middle thirds. In the middle of the congested area was found a small ulcer, almost the size of a 3-cent piece, on the inner surface of gut, with a minute perforation through the peritoneal coat. No other trace of disease was found throughout the whole length of small intestine. There was no foreign body in the intestine or in the peritoneal cavity. The appendix was perfectly healthy.

HOSPITALS.

NAVAL HOSPITAL, CHELSEA, MASS.

(*Note.*)

J. G. Ayers, *Medical Inspector.*

Febris enterica.—Six cases of typhoid fever were brought to this hospital from the West Indies in August. Two cases were from the United States Army. All were severe, but there was no death. In nearly all cases the lower lobes of both lungs were involved. Hemorrhages occurred in two cases. In one of the cases from the Army there was a scorbutic condition of the skin, most marked on chest and abdomen, that disappeared under lime and lemon juice.

Malarial organisms were found in all, crescents, round or oval cells with actively motile intracellular pigment, flagella, wheels with short flagella, and a few segmenting daisies. To those organisms were due certain irregular chills, temperature rising to 106° and falling to 97°.

In the case with scorbutic indications there were suppression of urine and albuminuria on admission, which disappeared under salol and potass. bitart. lemonade.

Widal's test was used in every case and clumping occurred in all, either at once or within twenty minutes. Baths were employed whenever the temperature was above 102.5° F.

Meningitis.—A landsman, aged 18$\frac{1}{12}$ years, was unconscious and delirious when admitted. There was discharge of pus from both ears, but principally from left. On the morning of the day of admission he had walked into the sick bay of his ship, complained of headache, and, after vomiting freely, had become comatose. He died the day after admission. The autopsy showed that the meningitis was the sequel of purulent otitis media.

Vulnus sclopeticum.—A boatswain's mate, second class, aged 40 years, was received on December 20 with great swelling of the right thigh and hip and temperature of 104° F.

There was a scar 2 inches above great trochanter and one 2 inches above Poupart's ligament, on a line with the midpoint of ligament and umbilicus.

It appeared that he had received the wounds while at target practice in January on U. S. S. *Marblehead*, the projectile from one of the new navy rifles (small arm), accidentally discharged, having struck the brass rim of a ventilator and, breaking into fragments, injured five men. From the abdominal wound a piece of lead weighing several grains had been removed at the time. The wound back of right hip, though 2 inches in diameter, was regarded as more or less superficial. There was also a small wound back of right leg. None of the wounds were regarded as serious, but still sufficient under the circumstances for hospital treatment. He was therefore transferred at the time, and when returned to the ship on February 28 all wounds had healed except that in the abdomen, which, however, did well, and he was discharged to duty on March 13, though still complaining of slight pains at times in the hip. On December 20 there was considerable swelling about the hip, and he was again transferred to the hospital, where, immediately after admission, an incision was made to the muscles on the external antero-lateral aspect, 6 inches below the anterior superior spine. About 8 ounces of pus were liberated. Exploration upward revealed a hard object, which, on removal, was found to be the distorted copper jacket of a bullet. The wound did well.

Fractura.—An ordinary seaman, aged 30 years, was admitted on October 21 with ununited fracture of right radius in middle third. It appeared that four years before, while fishing on the Grand Banks, the arm was disabled by a winch. He received no medical care for some weeks. At the time of enlistment in April last there was deformity of right wrist. He attributes his present condition to wrenching his arm while coaling ship and to the force exerted in shoving off a steam launch.

The lower fragment appeared to be anchylosed to the ulna, and the lower end of upper fragment seemed well rounded. It appeared not unlikely that the injury while in the service was a partial separation of the incomplete union between upper fragment and ulna. The fact that he did not apply for treatment during a month after the supposed injury in the service pointed in the same direction.

On October 29 the fractured ends were exposed, curetted, and brought together by two silver-wire sutures. The position of the fragments was determined previously by skiagraph. The end of the lower fragment was found by inspection to be closely attached to ulna by fibrous adhesions.

The wound of soft parts healed by first intention and the fragments became firmly united. He remained under treatment at the end of the year.

NAVAL HOSPITAL, NEWPORT, R. I.

(*Note.*)

C. A. SIEGFRIED, *Surgeon.*

Tuberculosis, treatment of.—There has been a series of tubercular cases treated in this hospital. They presented the usual pulmonary symptoms, with marked hemoptysis and the presence of tubercle bacilli in large numbers. The cases excited special interest on account of the results obtained from the administration of creosotal (carbonate of creosote). No other remedy, in my experience, produces such marked alleviation of symptoms and so many apparent recoveries. The drug is tolerated by all patients, improves appetite, checks cough, and changes very rapidly the character of the sputa. In a very short time the temperature falls to normal and, except slight exacerbations at times, remains so. The patients sleep well, and their improved condition and expression of well-being are very gratifying.

Scarlatina.—There was an epidemic of this disease at the training station. It was limited to 32 cases, all occurring between May 25 and June 21. None ended fatally. In one case the nephritis assumed a chronic character. Cultivation from throats showed marked evidence of mixed infection. Pure cultures were obtained of streptococcus pyogenes aureus and albus, and also rich cultures of the pneumococcus of Frankel.

All cases were immediately transferred to this hospital, where they were placed in Ducker pavilions and tents. As a result, no case has occurred in the main building.

Febris enterica.—A case of typhoid fever developed about June 12 among the Naval Reserves on the *Constellation*, and was transferred to this hospital. It was found that the patient contracted the disease at his home, from drinking the water from an old well under the family residence. Examination of the well water showed a large number of typhoid bacilli to the cubic inch.

The typhoid serum reaction was demonstrated, as also was the "diazo" reaction. It is interesting to note that after several trials a pure culture of the typhoid bacillus was obtained from the urine. Death occurred on July 5. His two brothers contracted the disease at about the same time and it is learned that death resulted in both cases. The father and mother (60 to 70 years of age) did not contract the disease, although using the water constantly.

NAVAL HOSPITAL, NEW YORK.

(*Note.*)

G. W. WOODS, *Medical Director.*

Hernia.—Bassini's operation was performed in five cases with excellent results, except that in one case atrophy of the testicle occurred, possibly from an epididymitis. In another case, the hernial sac was found to be congenital, and it was with some difficulty separated from the cord.

Appendicitis.—A gunner's mate, third class, aged 20 years, was admitted on August 23 with appendicitis. Three days previously, while on liberty, he had been seized with abdominal pain, diarrhœa, and vomiting, after indulging largely in a variety of fruits and other food.

Three hours after admission the usual incision was made over tumor. The omentum was separated from the parietal peritoneum, with which it had adhesions, and the tumor mass disclosed. There were no adhesions in the iliac fossa. The peritoneal cavity was protected by pads and the adhesions separated, beginning at cæcum. About 1 drachm of thin pus was evacuated from small abscess, of which the floor was the gangrenous perforated tip of appendix, which lay surrounded by omentum containing a concretion the size of a date pit. The appendix was found doubled on itself. It was freed from adhesions and mesentery tied off with catgut and cut. Appendix was clamped near bowel and removed, the stump being ligated with catgut (chromicized) and touched with actual cautery. The cavity was then mopped with solution bichloride 1:5000 and packed, and wound narrowed by silkworm sutures and dressed in usual manner—rubber tissue and wet sterile dressing. Temperature fell from 103° to 100° F. There were some vomiting the next day, colicky pains, and two watery stools. The case did very well, however, and on September 12 the sinus had almost closed. He was granted leave on October 10 and on the 22d he was discharged to duty well.

The two other cases requiring surgical interference made good recoveries. In all, eight cases were treated. There was one death. In that case, an eruption appeared on abdomen and lower thoracic region three days after admission, and there was prompt reaction to Widal's test. There was never any abdominal tumor apparent, but the other signs of appendicitis were present. He died of general peritonitis, and at the autopsy it was found that the appendix had sloughed. The diagnosis of febris enterica was, however, also confirmed by the autopsy.

Not included in the above cases is one of a private marine, aged 27 years, who was received with the diagnosis of catarrhus epidemicus. He had then been sick three days, pulse was 140, and temperature 100° F. On the next day appendicitis was suspected. Death took place the following day.

NAVAL HOSPITAL, PHILADELPHIA, PA.

(*Note.*)

GEORGE H. COOK, *Medical Director.*

Syphilis.—A cabin steward, aged $32\frac{7}{12}$ years, was admitted on October 22. There was general lymphatic glandular enlargement of neck, with a suppuration on left side and ulceration of throat. On December 7 he was somewhat incoherent. Tongue was heavily coated and showed pus. He could only partially open the mouth, on account of swelling in neck and jaw. On December 11 he was only semiconscious, and there was great difficulty in swallowing. On December 13 death occurred. Necropsy: Brain tissue apparently normal but markedly congested; caries and necrosis of right condyle of occipital bone and the whole of atlas and axis; right lung adherent to diaphragm and posterior chest wall, with one lobe atalectatic; both lungs tubercular; dilatation and ulceration of stomach; bladder dilated and with urine containing pus; retropharyngeal abscess; ulcer posterior surface of tonsils; small fatty tumors of scalp. The cause of death was considered to be tuberculosis.

Tuberculosis.—A beneficiary, aged 68 years, was admitted in January as with epithelioma. He was suffering with small, but rather deep ulcer on right cheek. It had existed for eighteen months, and was slowly enlarging. Under caustics and tonics the ulcer healed, and he was discharged on February 23. He was again admitted on April 1 as with syphilis consecutiva. He had a decided chill on that day. There was a small painless, fluctuating tumor on the right tenth rib, which, he stated, appeared a week before and followed an injury. Chill recurred on 7th. On the 18th his general condition was improved and he was discharged. On July 15 he was again admitted as with syphilis consecutiva. It was considered that the disease manifested itself chiefly in an apparent gummatous infiltration of right lung. There was dullness on percussion, cough, and a clear, starch-like sputum. A fistula was present on right side between ninth and tenth ribs, from which a purulent-looking fluid was escaping in considerable quantity. Examination of sputum showed bacillus tuberculosis, and on August 22 he was readmitted with tuberculosis pneumonica chronica. On September 10 death occurred. The autopsy showed that the right lung was practically a cavity of pus communicating externally through the fistula.

NAVAL HOSPITAL, WASHINGTON, D. C.

(*Note.*)

GEORGE A. BRIGHT, *Medical Director.*

Fractura.—On November 16, 1897, a patient 22 years of age, who had been an ordinary seaman, was admitted as a supernumerary, pending the determination of his claim for pension. It appeared that in the preceding March, while serving on the U. S. S. *Amphitrite* and working aloft, he fell from a stay above the flying bridge and sustained a compound fracture of lower third of left femur. The fracture apparently extended into the kneejoint and a fragment pierced the skin about 3 inches above the joint. An occlusive antiseptic dressing and proper splints were applied, and the ship being at Charleston, S. C., the patient was immediately transferred to hospital at that place, where, it is stated, the parts were adjusted under ether and the limb put up. He remained under treatment there until July 3, when he was transferred to the naval hospital at Norfolk. At that date there was considerable enlargement of the lower end of femur and kneejoint. The patella was slightly movable and there was flexion of 5°. The shortening was 1¼ inches. Lower fragment was rotated outward and in walking the foot was everted. At first the double inclined plane was utilized to aid in reducing the ankylosis. Then, on August 3 and 26, the knee was bent, under chloroform, until some of the adhesions were broken. Massage and passive motion were practiced, but, though there was improvement, there was no prospect of recovery from disablity, and on November 13 he was invalided from service.

Three days later he was admitted to this hospital with no control over the kneejoint. The leg would flex on the thigh about 45° by its own weight, but when further flexed would have to be drawn back by the hand. There was no power whatever to extend the leg, and he could not take a step without assistance. There was a great deal of callus at site of fracture. It was uneven and, anteriorly, seemed to be just beneath the integument. After the application of a tight figure-of-8 bandage he could walk a short distance with a cane, but invariably suffered considerable pain at the time and for hours afterwards. In December a brace extending from the shoe well up the thigh was applied, but it did not greatly aid. On January 10, 1898, amputation was considered advisable, and was performed at the junction of the middle and lower thirds, the lowest point where healthy bone could be obtained. The result was satisfactory, and on February 17 he appeared before the pension board at its office. On April 14, his affairs having been satisfactorily arranged, he was discharged.

Bursitis (*hallux valgus*).—A private marine, age 40 years, was admitted with a left suppurating bunion. The head of first metatarsal and base of first phalanx were resected. The sinus was excised. The bones were wired and silicate of sodium dressing applied. The result was excellent and he was discharged to duty.

Hernia.—On the night of February 15 a private marine, aged 27, when on post at the Washington Navy-Yard, fell over some obstruction and struck the abdomen against a vertical piece of metal. At first only a contusion was apparent, but on the next day a ventral hernia in the mid-line, about an inch above the umbilicus, was noticeable. When admitted to the hospital on the 17th he complained of a sinking sensation and nausea.

The tumor was about the size of a walnut and reducible. On March 18 it was determined to operate, as, though the pad and bandage retained the hernia when at rest, the slightest exertion caused its protrusion with much distress. An incision was made, omental fat removed, and the wound closed by deep and superficial sutures. On April 12 he was discharged to duty, wearing an elastic band with hernia pad, but apparently well.

NAVAL HOSPITAL, NORFOLK, VA.

(*Note.*)

C. J. Cleborne, *Medical Director.*

Diabetes mellitus.—A carpenter's mate, third class, aged 23$\frac{8}{12}$ years, was admitted April 9. It appeared from the hospital ticket that he had only reported for treatment on the previous day and had noticed the increase in quantity of urine five days previously. He had been under treatment for syphilis since September, 1896, when he had a chancre that was followed by secondary symptoms. The amount of urine passed on April 11 was 151½ ounces, and the percentage of sugar was large. Constipation was marked; amount of urine diminished, and on April 19 there was almost suppression. At the same time he was semicomatose and in the morning had a severe attack of angina pectoris. On April 20 he was comatose, and death occurred that evening from uræmic poisoning. Necropsy: Emaciation moderate; heart hypertrophied and right walls soft; kidneys much enlarged and fibrous; liver very much hypertrophied, with numerous deposits in its substance of a fibrous nature, probably syphilitic; right lower lobe of lung in a state of fatty degeneration.

Rheumatismus articularis.—A quartermaster, 32$\frac{10}{12}$ years of age, was admitted April 26. He had been sick for four days, but had only reported for treatment on his ship the day of admission. He gave a history of an attack of rheumatism about five years before. On admission the temperature was 102°F. and both ankles and knees were slightly swollen. He was kept under the influence of salicylic acid and alkalies for ten days, but the fever continued, though the pain and swelling in joints subsided. On May 8 a systolic blowing murmur appeared at apex. On the next day his face and conjunctivæ appeared slightly jaundiced and the urine contained bile pigments. The stools were clay colored and the fever continued. On May 10 the jaundice was marked and had extended over arms and trunk. The skin itched and was dry. The cardiac action was regular and pulse good. In the evening he vomited blood and bile in small amounts and the abdomen was markedly tympanitic. The cardiac murmur was more pronounced. Phosphate of soda, calomel, and bicarbonate of soda were administered, and cantharidal collodion was applied to præcordia. On May 11 the jaundice was less marked and there was sweating. There was profuse vomiting of blood and bile in the afternoon. Death occurred in the evening. Necropsy: Mitral insufficiency and fibroid deposits on the valves; right side of heart enlarged and tricuspid valves roughened; the parietal and visceral layers of pericardium were united in the upper portions, apparently by old adhesions, and the lower part contained about 2 ounces of serum; spleen diminished in size, but with increased connective tissue; liver yellow, soft, and friable, diminished in size and weight and showing yellow patches; intestines distended with gas, yellowish, and with ecchymotic patches; stomach thin and easily torn, distended and ecchymotic; calvarium adherent, dura thickened, gray matter diminished, fibrinous deposits, neuroglia increased.

NAVAL HOSPITAL, MARE ISLAND, CAL.

(*Note.*)

G. P. Bradley, *Medical Inspector.*

Angina pectoris.—A private marine, aged $42\frac{4}{12}$ years, was admitted on September 1 with angina pectoris. The history extended over a period of several years, during which there had been numerous attacks and was associated with the excessive and long-continued use of alcoholics.

The heart sounds were pronounced, especially over the aortic valves, where also a slight systolic bruit was apparent. There was also some cardiac hypertrophy. The attacks of angina were characteristic and severe and increasing in frequency occurring once or twice a week instead of every month or two, as at first.

On admission, the pain during the attacks was, at times, referred chiefly to the diaphragm. Quinine was tried in large doses, and also arsenic, glonoinum, spirit. æther. comp., and whisky, but without success. The only drug that had any controlling power was opium. On October 1 he was, however, taking 12 grains daily, but averaging an attack every twenty-four hours. During the attack he was given morphia gr. $\frac{3}{4}$ with good results. From November 5 to December 6 there were longer intervals between attacks and injections of glonoinum seemed to be of benefit. But the improvement did not continue, the intervals diminishing and then increasing at different periods. On February 26, 1898, he had three severe attacks. More or less pain continued during intervals, and on the 27th chloroform was administered until a hypodermic of morphia could give relief. On April 6 death occurred in a paroxysm which lasted five minutes. Necropsy: Ventricles hypertrophied; aorta and coronary arteries atheromatous, having calcareous deposit and spleen double the normal size.

NAVAL HOSPITAL, YOKOHAMA, JAPAN.

(*Note.*)

F. ANDERSON. *Surgeon.*

Carcinoma.—On November 30, 1897, a seaman, aged 44, was admitted, suffering apparently with nervous dyspepsia. His hospital ticket gave a history of pain over stomach and left hypochondriac region, increasing emaciation, œdema of feet and legs, constipation, and weak heart action. He was temperate in habits and without history of venereal trouble. Pain was always aggravated by eating, and there was occasional vomiting after meals, but with no indications of blood.

Skin was harsh and dry and appeared somewhat scaly over abdomen. Seemed to be prematurely old, and there was an apparent arcus senilis.

The abdominal walls were very lax, but, except a dimunition in size of liver and an apparent dilation of the stomach, nothing abnormal could be discovered by palpation and percussion. The temperature continued normal and examinations of urine were negative.

The history in hospital was not without interest, as on several occasions he vomited a watery fluid having a strong fecal odor. His bowels at the time were moving regularly, the vomiting was not prolonged, and there were no signs of intestinal obstruction. His appetite was fairly good, but the emaciation progressed. After January 15, 1898, the case progressed rapidly to a termination. On the 19th he vomited about 4 ounces of clotted blood and again on the 20th. Death occurred on January 21. Necropsy: Stomach small and for about 2 inches firmly adherent to transverse colon; posterior wall of stomach felt nodular and thick, while a black spot on its anterior wall proved to be an area of softening, which broke down when touched, and allowed leakage. The organ was not removed, because of adhesions, but when opened the mucous membrane seemed studded with nodules, some as large as pigeon's eggs; an opening one-half inch in diameter connected the cavities of the stomach and transverse colon.

Aneurysma.—On August 17, 1897, a quartermaster, third class, aged 29$\frac{9}{12}$ years, was admitted with aneurism. At that time there was a small tumor in the fourth intercostal space, near right margin of sternum. The tumor pulsated with the systole, but there was no bruit heard at any time during the continuance of the case. He had only noticed the swelling four days before admission, but had had pain in chest from time to time since October, 1896, in which month he had been on the sick list for about three weeks as with myalgia.

On admission, the apex of heart was found displaced to the left, where a faint systolic murmur was heard. There were a soft blowing systolic murmur over tumor and a marked systolic murmur in second right intercostal space. The murmurs were not apparent behind. The pain was not confined to tumor, but felt at times over whole front of chest.

The tumor increased slowly from the day of admission, and paroxysms of pain were marked at night. The right radial pulse was much less strong than left. About the middle of March discoloration of the apex of tumor became noticeable and this increased slowly. On June 10 the integument over the most prominent part of swelling showed a small break through which a small amount of bloody serum oozed. The oozing increased from day to day, and on June 20 there was a severe hemorrhage, which caused unconsciousness. Twice on the 21st the bleeding recurred. On the 22d there were two hemorrhages, and the second caused death. Necropsy: Body greatly emaciated; slightly to the right of the midline of chest was a tumor 4 inches in diameter at its base and 3 inches high, the base extending from the upper border of the second to the lower border of the fifth rib, and its center in line with the nipples; integument over apex of tumor necrotic and with an opening 1 inch in diameter, plugged from within with a much discolored layer of tissue, which bulged through the opening. An aneurysmal sac was found in contact with and adherent to the right side of heart, and communicating with the aorta just above the valves by an opening one-fourth inch in diameter; pericardium was everywhere strongly adherent to heart and aneurism; cartilages of third, fourth, and fifth ribs and entire sternum (except xiphoid cartilage) below level of second rib were absorbed; capacity of aneurysmal sac was 8 ounces, and it was filled with recently formed soft clot.

STATISTICAL TABLES.

The following statistical tables give, in detail, the data on which the statements of this report are based:

I. General view of the effects of disease and injury on the Navy and Marine Corps during the year 1898.

II. *North Atlantic Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospitals, discharges from the service, and deaths on each ship for the year 1898.

III. *Pacific Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospitals, discharges from the service, and deaths on each ship during the year 1898.

IV. *Asiatic Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospitals, discharges from the service, and deaths on each ship for the year 1898.

V. *Receiving ships.*—Names of ships, average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospitals, discharges from the service, and deaths on each ship for the year 1898.

VI. *Navy-yards, marine barracks, and other shore stations.*—Names, average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospitals, discharges from the service, and deaths during the year 1898.

VII. *Force afloat.*—General aggregate, 1898.

VIII. *Force afloat.*—Detailed statement, 1898.

IX. *Navy-yards and other shore stations.*—General aggregate, 1898.

X. *Navy-yards and other shore stations.*—Detailed statement, 1898.

XI. *Naval hospitals.*—General aggregate, 1898.

XII. *Naval hospitals.*—Detailed statement, 1898.

XIII. *Prevalence of special diseases (relation by scale).*—1898.

XIV. *Mortuary record.*—1898.

XV. *Deaths in the Navy and Marine Corps during the year 1898 (relation by scale).*

TABLE I.—*General view of the effects of disease and injury on the Navy and Marine Corps during the year 1898.*

Average strength of the Navy and Marine Corps	[1] 23,986
Average strength shown by reports of Medical Department	[2] 23,038
Admissions for disease, ashore and afloat	16,021
Ratio per 1,000 of strength afloat	695.42
Ratio per 1,000 for previous year	594.46
Ratio per 1,000 for three preceding years	629.62
Admissions for injury, ashore and afloat	4,061
Ratio per 1,000 of strength	176.27
Ratio per 1,000 for previous year	153.79
Ratio per 1,000 for three preceding years	155.83
Total admissions to sick list during the year	20,082
Ratio per 1,000 of strength	871.69
Ratio per 1,000 for previous year	748.24
Ratio per 1,000 for three preceding years	785.44

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[1] Used in computing ratios of deaths and discharges from service for disability.

[2] Used in computing all ratios except those of deaths and discharges from service for disability.

Daily average of patients	678.63
Ratio per 1,000 of strength	29.46
Ratio per 1,000 for previous year	29.82
Ratio per 1,000 for three preceding years	31.14
Total number of sick days	247,705
Average for each man of Navy and Marine Corps	10.75
Average for previous year	10.88
Average for three preceding years	11.37
Average days each case was treated	12.33
Average for previous year	14.55
Average for three preceding years	14.48
Discharges from service for disease	721
Ratio per 1,000 of strength	30.06
Ratio for previous year	17.86
Ratio for three preceding years	15.42
Discharges from service for injury	163
Ratio per 1,000 of strength	6.80
Ratio per 1,000 for previous year	2.99
Ratio per 1,000 for three preceding years	2.62
Total discharges for disability	884
Ratio per 1,000 of strength	36.85
Ratio per 1,000 for previous year	20.85
Ratio per 1,000 for three preceding years	18.04
Deaths from diseases	118
Ratio per 1,000 of strength	4.92
Ratio per 1,000 for previous year	3.56
Ratio per 1,000 for three preceding years	4.41
Deaths from injury (including poison)	55
Ratio per 1,000 of strength	2.29
Ratio per 1,000 for previous year	2.03
Ratio per 1,000 for three preceding years	1.54
Total deaths from all causes	173
Ratio per 1,000 of strength	7.21
Ratio per 1,000 for previous year	5.59
Ratio per 1,000 for three preceding years	5.94

TABLE II.—*North Atlantic Station.—Average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship, for the year 1898.*

Name of ship.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Abarenda[1]	183 days	33	25	16	41	1,242.42	351	1.92	29.09	3	----	---
Ajax[2]	38 days	9	13	3	16	1,777.78	38	1.00	11.63	3	----	---
Alexander[2]	151 days	20	14	8	22	1,100.00	153	1.01	21.04	9	----	---
Alliance	Year	157	176	66	242	1,541.40	1,137	3.12	19.87	54	----	---
Amphitrite	Year	163	196	46	242	1,484.66	1,012	2.78	17.06	58	2	3
Annapolis	Year	149	91	32	123	825.50	1,088	2.98	20.00	14	----	---
Arctic[2]	40 days	6	10	4	14	2,333.34	31	.78	14.18	2	----	1
Arethusa[1]	92 days	21	9	3	12	571.43	48	.52	6.27	2	----	---
Armeria[2]	124 days	16	25	3	28	1,750.00	88	.71	15.11	5	3	---
Bache	Year	44	21	4	25	568.18	225	.62	14.09	3	----	---
Badger[1]	251 days	171	39	5	44	257.31	220	.88	3.53	7	----	1
Bancroft[3]	273 days	102	86	17	103	1,009.80	770	2.82	20.74	18	----	1
Blake	Year	41	24	11	35	853.66	302	.83	20.24	5	1	---
Brooklyn	Year	513	355	111	466	908.38	3,694	10.12	19.73	30	5	4
Buffalo[1]	92 days	146	140	18	158	1,082.19	745	8.09	13.97	16	---	---
Cæsar[1]	203 days	32	58	19	77	2,406.25	272	1.34	23.01	10	----	---
Cassius[2]	167 days	48	76	15	91	1,895.83	499	2.81	26.76	17	----	---
Castine	Year	144	104	27	131	909.72	1,488	4.08	28.33	26	----	---
Catskill[2]	157 days	12	34	6	40	3,333.34	121	.78	27.86	1	----	---
Celtic[1]	220 days	75	90	23	113	1,506.67	730	3.32	40.49	17	2	---

[1] Commissioned. [2] Commissioned and out of commission. [3] Out of commission.

TABLE II.—*North Atlantic Station.—Average complements corrected for time admissions for disease and injury, etc.*—Continued.

Name of ship.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Chicago[1]	92 days	91	31	6	37	406.59	124	1.35	3.74	13	2	1
Cincinnati	Year	344	327	61	388	1,127.91	2,697	7.39	21.48	61	----	---
Columbia	Year	242	164	35	199	822.31	1,008	2.76	11.40	57	----	---
Detroit	Year	231	90	24	114	493.51	1,242	3.40	14.72	13	----	---
Dixie	257 days	182	15	5	20	109.89	101	.39	1.38	12	----	---
Dolphin[1]	283 days	95	55	13	68	715.79	441	1.56	12.68	10	----	---
Dorothea[2]	105 days	18	18	4	22	1,222.22	122	1.16	18.41	12	----	---
Eagle[1]	274 days	44	31	13	44	1,000.00	183	.67	11.36	2	1	---
East Boston[2]	23 days	3	6	----	6	2,000.00	16	.70	14.58	1	----	---
Essex[2] [1]	182 days	107	93	10	103	962.61	604	3.32	15.44	14	----	1
Fern[3]	267 days	38	31	8	39	1,026.32	200	.75	14.42	7	----	---
Fish Hawk	Year	45	40	7	47	1,044.44	249	.68	15.11	10	----	---
Frolic[2]	76 days	9	11	2	13	1,444.44	51	.67	15.58	4	----	---
Glacier[2]	171 days	57	69	20	89	1,561.40	702	4.11	33.69	7	----	---
Gloucester[2]	167 days	43	47	14	61	1,418.60	355	2.13	22.66	10	----	---
Gov. Russell[2]	45 days	6	8	1	9	1,500.00	22	.49	10.00	----	----	1
Hamilton[2]	130 days	22	16	1	17	772.72	46	.36	6.92	3	----	---
Hannibal[2]	126 days	17	20	4	24	1,411.76	72	.57	11.63	5	----	---
Harvard[2]	131 days	141	40	9	49	347.52	305	2.32	42.96	12	2	---
Helena	Year	191	100	12	112	586.34	712	1.95	10.21	16	----	1
Hist[1]	228 days	35	25	5	30	857.14	219	.96	17.14	2	----	---
Hornet[2]	184 days	27	35	19	54	2,000.00	229	1.24	22.96	11	----	---
Indiana	Year	516	309	108	417	808.14	2,415	6.62	12.83	31	5	---
Iowa	Year	561	278	87	365	650.52	2,709	7.42	13.23	38	3	1
Iris[1]	153 days	33	75	10	85	2,575.76	500	3.27	3.42	15	----	---
Jason[2]	103 days	28	13	5	18	642.86	80	.78	7.88	1	----	---
Justin[2]	184 days	41	102	29	131	3,195.12	787	4.28	52.84	3	----	---
Katahdin[2]	204 days	49	78	21	99	2,020.41	366	1.79	20.34	37	----	1
Lancaster[1]	241 days	169	138	48	186	1,100.59	829	3.44	13.44	58	18	1
Lebanon[1]	260 days	44	29	5	34	772.73	89	.34	5.48	17	----	---
Lehigh[2]	131 days	36	8	5	13	361.11	25	.11	1.10	4	----	---
Leonidas[2]	184 days	25	43	7	50	2,000.00	481	2.61	52.20	4	----	---
Machias	Year	136	81	20	101	742.65	1,045	2.87	21.10	21	----	2
Maine[3]	98 days	95	11	319	330	1,500.00	1,810	18.48	52.06	14	----	260
Manhattan[2]	21 days	6	6	1	7	1,166.67	17	.81	7.79	----	----	---
Manning[2]	130 days	33	53	7	60	1,818.18	198	1.52	16.52	3	----	---
Maple[2]	102 days	15	17	1	18	1,200.00	144	1.41	26.11	4	----	---
Marblehead	Year	240	220	58	278	1,158.33	2,124	5.82	24.25	34	1	3
Marcellus[1]	145 days	25	17	4	21	840.00	37	.26	4.13	7	----	---
Marietta	Year	135	148	18	166	1,229.63	1,229	3.37	24.96	11	----	---
Massachusetts	Year	450	345	90	435	966.67	2,293	6.28	13.96	49	----	3
Mayflower[1]	275 days	130	61	25	86	661.54	1,006	3.69	21.46	12	1	---
Miantonomoh[1]	297 days	111	102	20	122	1,099.10	658	2.22	16.32	15	2	---
Michigan	Year	93	30	5	35	376.34	234	.64	6.88	----	2	---
Minneapolis	Year	268	178	50	228	850.75	1,268	3.47	12.57	38	2	---
Minnesota[2]	79 days	54	63	20	83	1,137.04	237	3.00	14.78	----	----	---
Montauk[2]	117 days	27	38	16	54	2,000.00	373	3.19	37.95	----	----	---
Montgomery	Year	268	264	32	296	1,104.48	1,791	4.91	18.32	24	1	---
Morrill[2]	134 days	21	34	3	37	1,761.90	162	1.06	18.60	5	----	---
Nahant[2]	142 days	34	49	38	87	2,558.82	509	3.58	41.15	5	4	---
Nantucket[2]	107 days	29	23	17	40	1,379.31	98	.92	9.29	----	----	---
Nashville	Year	163	124	26	150	920.25	907	2.49	15.28	13	----	---
Newport[3]	250 days	94	62	16	78	829.79	714	2.86	20.88	16	----	2
Newark[1]	225 days	206	251	71	322	1,563.11	2,274	1.01	3.02	40	3	---
New Orleans[1]	289 days	292	222	58	280	958.91	1,003	3.47	9.40	30	1	---
New York	Year	596	400	97	497	833.89	4,537	12.43	20.86	47	2	4
Niagara[2]	174 days	28	50	9	59	2,107.14	323	1.86	31.53	12	1	---
Oregon	Year	463	218	70	288	622.03	2,329	6.38	13.78	35	----	1
Panther[1]	124 days	103	40	6	46	446.60	226	1.28	4.22	4	----	---
Passaic[2]	124 days	36	41	11	52	1,444.44	308	2.48	23.40	3	1	---
Peoria[2]	98 days	13	12	3	15	1,153.85	58	.59	12.29	1	2	---
Pompey[1]	220 days	25	53	13	66	2,640.00	97	.44	10.73	17	----	2
Prairie[1]	257 days	122	62	12	74	606.55	267	1.04	6.01	21	----	---
Princeton[1]	219 days	77	86	21	107	1,389.61	418	1.91	14.92	25	----	---
Puritan	Year	165	140	43	183	1,109.09	1,001	2.74	16.61	34	2	---
Resolute[1]	252 days	124	96	19	115	927.42	558	2.21	12.27	34	----	2
San Francisco[3]	328 days	321	236	50	286	890.96	1,947	5.94	16.64	60	4	2
Saturn[2]	199 days	28	43	8	51	1,821.43	196	.98	19.22	14	----	---
Scindia[1]	225 days	82	85	13	98	1,195.12	420	1.87	14.27	7	----	---
Scorpion[1]	253 days	73	59	6	65	890.41	410	1.62	15.43	13	----	---

[1] Commissioned. [2] Commissioned and out of commission. [3] Out of commission.

TABLE II.—*North Atlantic Station.—Average complements corrected for time, admissions for disease and injury, etc.*—Continued.

Name of ship.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Siren [1]	73 days	8	26	2	28	3,500.00	104	1.42	35.50	2	----	---
Solace [2]	262 days	104	109	21	130	1,250.00	3,238	12.37	84.97	214	4	1
Southery [2]	246 days	44	71	9	80	1,818.18	388	1.58	24.31	9	----	---
Sterling [2]	260 days	40	36	7	43	1,075.00	256	.98	17.50	12	----	---
Stranger [1]	81 days	10	4	2	6	600.00	21	.26	5.78	3	----	---
St. Louis [1]	131 days	23	17	2	19	826.09	247	1.89	29.53	10	----	---
St. Paul [1]	134 days	159	158	28	186	1,169.81	901	.67	1.55	30	----	1
Supply [2]	242 days	58	78	12	90	1,551.72	585	2.42	27.81	14	----	---
Suwanee [1]	95 days	17	8	4	12	705.88	36	.38	5.85	1	----	---
Sylvia [1]	77 days	8	18	2	20	2,500.00	82	1.06	27.89	3	1	---
Terror	Year	144	126	32	158	1,097.22	1,044	2.86	19.86	29	2	---
Texas	Year	417	230	96	326	781.77	1,715	4.70	11.27	53	----	2
Topeka [2]	229 days	114	98	13	111	973.68	641	2.50	13.74	18	----	---
Torpedo boats [1]	181 days	81	15	4	19	234.57	173	.96	5.89	7	----	---
Vesuvius [3]	259 days	54	23	11	34	629.63	282	1.09	14.34	4	----	---
Vicksburg	Year	146	68	15	83	568.49	590	1.62	11.09	17	----	1
Viking [1]	124 days	12	5	3	8	666.67	38	.31	8.86	2	----	---
Vixen [2]	144 days	32	49	3	52	1,625.00	378	2.63	32.47	18	----	---
Vulcan [2]	224 days	134	42	10	52	388.89	209	.93	4.27	34	----	1
Wasp [1]	170 days	25	32	2	34	1,360.00	144	.85	15.74	4	----	---
Wilmington	Year	187	139	41	180	962.56	1,440	.39	2.08	23	----	---
Windom [1]	139 days	26	20	4	24	923.08	89	.64	9.41	11	1	---
Woodbury [1]	135 days	23	31	4	35	1,521.73	179	1.33	21.46	8	----	---
Wyandotte [1]	51 days	12	----	5	5	416.67	31	.62	7.21	----	----	---
Yale [1]	124 days	133	90	21	111	834.59	589	4.75	12.15	7	----	1
Yankee [1]	262 days	139	199	83	282	2,028.78	1,211	4.62	7.21	15	7	2
Yankton [2]	230 days	46	43	7	50	1,086.91	200	.87	11.92	5	1	---
Yosemite [2]	263 days	162	230	27	257	1,586.42	1,198	.75	3.33	26	3	---

[1] Commissioned and out of commission. [2] Commissioned. [3] Out of commission.

TABLE III.—*Pacific Station.—Average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship, for the year 1898.*

Name of ship.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Adams [1] [2]	206 days	91	92	15	107	1,175.82	585	2,86	17.76	25	----	---
Albatross	Year	62	26	3	29	467.74	222	.61	9.84	4	----	---
Alert [2]	147 days	52	17	5	22	423.08	156	1.06	8.69	1	----	---
Bennington	Year	193	169	31	200	1,036.29	1,590	4.36	22.59	27	----	1
Gedney	Year	31	12	3	15	483.87	117	.32	10.32	1	----	---
McArthur	Year	30	5	----	5	166.67	22	.06	2.00	1	----	---
Monadnock	Year	177	106	27	133	751.41	969	2.65	14.97	13	----	---
Monterey	Year	194	138	31	169	871.13	1,302	3.57	18.40	9	----	---
Mohican [2]	271 days	166	161	32	193	1,162.65	1,254	4.63	20.76	16	3	2
Patterson [2]	90 days	15	6	0	6	400.00	43	.48	7.87	----	----	---
Pensacola [1]	90 days	29	21	5	26	896.55	127	1.41	11.95	----	1	1
Philadelphia [1]	176 days	178	100	35	135	758.43	938	5.33	14.44	15	----	---
Wheeling	Year	133	120	28	148	1,112.78	1,036	2.84	21.35	31	1	---
Yorktown [1]	45 days	21	16	5	21	1,000.00	107	2.38	14.09	6	----	---

[1] Commissioned. [2] Out of commission.

TABLE IV.—*Asiatic Station.—Average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship, for the year 1898.*

Name of ship.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Num	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Baltimore	Year	385	155	31	186	483.12	2,012	5.52	14.34	22	1	2
Boston	Year	275	230	36	266	967.27	2,022	5.54	20.15	9	....	2
Brutus[1]	219 days	30	30	13	43	1,433.33	308	1.41	28.20	8	....	...
Charleston[1]	241 days	202	209	51	260	1,287.13	2,629	10.91	35.65	19	....	...
City of Peking[2]	107 days	17	15	2	17	1,000.00	274	2.56	44.38	10	....	...
Concord	Year	188	189	38	227	1,207.45	1,533	4.20	22.34	9	....	...
Monocacy	Year	119	77	12	89	747.90	985	2.70	22.69	1	....	1
Nero[1]	200 days	35	38	6	44	1,257.14	388	1.94	30.31	1	....	...
Olympia	Year	524	169	25	194	370.23	2,278	6.24	11.91	23	....	2
Petrel	Year	127	132	15	147	1,157.64	1,071	2.93	23.07	3	....	3
Raleigh	Year	286	205	36	241	842.64	1,917	5.25	18.36	10	....	3

[1] Commissioned.

[2] Commissioned and out of commission.

TABLE V.—*Receiving ships.—Average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship for the year 1898.*

Name of ship.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Franklin	Year	372	98	20	118	317.20	665	1.82	4.89	44	3	2
Independence	Year	517	282	41	323	624.76	1,410	3.86	7.47	87	6	...
Richmond	Year	326	195	33	228	699.39	588	1.61	4.94	106	15	...
Vermont	Year	786	517	73	590	750.64	2,089	5.72	7.28	151	....	5
Wabash	Year	353	217	40	257	728.05	1,002	2.75	7.79	101	....	2

TABLE VI.—*Navy-yards, marine barracks, and other shore stations.—Average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths for the year 1898.*

Name.	Period.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Yards and marine barracks:												
Portsmouth	Year	132	86	12	98	742.42	408	1.12	8.48	33	----	1
Boston	Year	245	172	22	194	791.84	782	2.14	8.73	85	----	1
New York	Year	328	247	76	323	984.75	1,636	4.48	13.66	90	----	---
Philadelphia	Year	149	98	31	129	865.77	458	1.25	8.40	29	----	---
Washington	Year	203	197	33	230	1,133.01	754	2.07	10.20	91	2	1
Norfolk	Year	124	115	14	129	1,040.32	617	1.69	13.63	48	----	---
Pensacola	Year	71	43	6	49	690.14	141	.39	5.49	17	----	---
Mare Island	Year	209	125	28	153	732.06	1,274	3.49	16.70	10	5	1
Marines—												
Headquarters	Year	194	193	45	238	1,226.80	967	2.65	13.66	77	----	---
Sitka	Year	35	7	3	10	285.71	-------	------	-------	10	----	---
Guantanamo Bay.	150 days	238	156	54	210	882.35	1,614	10.76	18.58	42	----	6
Stations at—												
Newport	Year	639	223	30	253	395.93	231	.63	.99	215	----	---
New London	187 days	5	1	-----	1	200.00	8	.04	.09	----	----	---
Annapolis	Year	423	273	156	429	1,014.18	2,456	6.73	15.91	----	----	4
Indian Head	Year	7	2	1	3	428.57	32	.09	12.85	----	----	---
Port Royal	Year	66	23	8	31	469.70	288	.79	11.97	----	----	1
Port Royal (reserves).	97 days	13	15	3	18	1,384.62	120	1.24	25.31	----	----	---
Key West	169 days	21	62	4	66	3,142.38	376	2.23	49.56	3	----	---
San Juan	57 days	9	19	-----	19	2,111.11	181	3.18	54.83	----	----	---
Puget Sound	Year	55	16	8	24	436.36	206	.56	10.18	1	----	---
Special duty at—												
New York	Year	-----	7	1	8	----------	89	------	-------	----	----	2
Philadelphia	Year	-----	24	3	27	----------	348	------	-------	1	----	---
Washington	Year	-----	66	4	70	----------	783	------	-------	3	----	1
San Francisco	Year	-----	2	-----	2	----------	51	------	-------	----	----	---

TABLE VII.—*Force afloat.—General aggregate, 1898.*

Classification of diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
Class I.												
Parasites and parasitic diseases	-----	39	4	34	8	----	----	----	----	----	1	212
Class II.												
General infectious diseases (non-venereal)	18	3,264	324	2,834	687	9	4	----	2	14	56	20,241
Class III.												
Constitutional disorders of nutrition	2	90	4	60	30	2	2	----	----	1	1	619
Class IV.												
Diseases of the nervous system	7	1,796	140	1,660	267	33	6	2	----	6	23	8,168
Class V.												
Diseases of the visual apparatus	6	185	24	151	56	4	----	----	----	----	4	1,413
Class VI.												
Diseases of the auditory apparatus	1	150	22	143	30	----	----	----	----	----	----	939
Class VII.												
Diseases of the olfactory apparatus	1	94	1	89	7	----	----	----	----	----	----	300
Class VIII.												
Diseases of the nutritive apparatus:												
Subsidiary class 1—Diseases of the digestive apparatus	16	2,913	112	2,771	235	6	5	----	2	5	17	11,515
Subsidiary class 2—Diseases of the circulatory apparatus	2	171	27	108	77	6	1	----	----	3	5	1,932
Subsidiary class 3—Diseases of the respiratory apparatus	8	1,293	71	1,179	174	6	----	----	----	1	12	6,832
Class IX.												
Diseases of the motory apparatus	9	604	31	538	92	6	----	----	----	----	8	3,735
Class X.												
Diseases of the cutaneous apparatus	5	1,166	93	1,174	72	3	----	----	----	----	15	9,090
Class XI.												
Venereal diseases and diseases of the genito-urinary apparatus	38	781	252	1,385	594	26	1	----	3	3	59	19,344
Class XII.												
Cysts and new growths	-----	21	------	12	9	----	----	----	----	----	----	114
Class XIII.												
Injuries	34	3,289	208	2,735	433	21	----	----	2	294	46	24,386
Class XIV.												
Extraneous bodies	-----	8	1	7	2	----	----	----	----	----	----	25
Class XV.												
Poisons	1	289	3	265	17	----	----	----	----	6	5	987
Class XVI.												
Feigned diseases	-----	3	------	3	------	----	----	----	----	----	----	15
Total	148	17,156	1,317	15,094	2,790	212	19	2	9	333	252	109,867

TABLE VIII.—*Force afloat—Detailed statement, 1898.*

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS I.												
Parasites and parasitic diseases.												
Filaria sanguinis	----	1	----	1	----	----	----	----	----	----	----	2
Pediculus	----	4	1	5	----	----	----	----	----	----	----	45
Scabies	----	7	----	2	5	----	----	----	----	----	----	14
Tænia	----	9	1	8	2	----	----	----	----	----	----	15
Tinea favosa	----	3	----	3	----	----	----	----	----	----	----	6
Tinea trichophytina	----	14	2	14	1	----	----	----	----	----	1	128
Other diseases of this class	----	1	----	1	----	----	----	----	----	----	----	2
CLASS II.												
General infectious diseases (non-venereal).												
Cachexia malarialis	----	76	14	61	27	----	2	----	----	----	----	547
Catarrhus epidemicus	2	895	23	810	71	2	----	----	----	----	37	4,344
Cholera morbus	----	36	----	34	2	----	----	----	----	----	----	104
Denguis	----	15	----	15	----	----	----	----	----	----	----	142
Diphtheria	----	2	----	1	1	----	----	----	----	----	----	4
Dysenteria acuta	----	52	8	35	21	----	----	----	----	4	----	519
Dysenteria chronica	----	6	5	5	6	----	----	----	----	----	----	86
Erysipelas	----	18	----	11	7	----	----	----	----	----	----	160
Febris enterica	4	88	10	21	75	----	1	----	----	2	3	1,085
Febris flava	----	3	----	2	----	----	----	----	----	1	----	11
Febris intermittens	1	728	115	792	49	----	----	----	2	----	1	3,118
Febris pneumonica	----	49	1	9	36	----	----	----	----	2	3	416
Febris recurrens	----	3	1	2	2	----	----	----	----	----	----	54
Febris remittens	5	496	62	458	97	1	1	----	----	3	3	4,135
Morbilli	----	111	----	40	71	----	----	----	----	----	----	386
Parotitis epidemica	----	46	----	18	26	----	----	----	----	----	2	231
Rheumatismus articularis acutus	4	217	40	204	52	1	----	----	----	----	4	2,056
Rheumatismus articularis chronicus	----	67	18	50	32	1	----	----	----	----	2	550
Rubella	----	41	----	26	15	----	----	----	----	----	----	131
Scarlatina	----	1	----	----	1	----	----	----	----	----	----	0
Septicæmia	----	2	----	----	1	----	----	----	----	1	----	3
Tuberculosis miliaris acuta	----	1	----	----	1	----	----	----	----	----	----	25
Tuberculosis pneumonica acuta	----	30	8	3	34	1	----	----	----	----	----	398
Tuberculosis pneumonica chronica	1	50	17	9	55	3	----	----	----	----	1	532
Tuberculosis of other parts	----	1	----	----	1	----	----	----	----	----	----	37
Vaccina	----	227	2	227	2	----	----	----	----	----	----	1,151
Variola	1	3	----	1	2	----	----	----	----	1	----	16
CLASS III.												
Constitutional disorders of nutrition.												
Anæmia	----	51	2	37	13	1	2	----	----	----	----	314
Debilitas senilis	----	14	1	8	5	1	----	----	----	----	1	104
Diabetes insipidus	----	1	----	----	1	----	----	----	----	----	----	0
Diabetes mellitus	----	7	----	1	5	----	----	----	----	1	----	43
Hæmophilia	----	2	----	2	----	----	----	----	----	----	----	18
Lithæmia	2	6	----	4	4	----	----	----	----	----	----	72
Pseudoleucocythæmia	----	1	----	----	1	----	----	----	----	----	----	3
Purpura hæmorrhagica	----	2	----	1	1	----	----	----	----	----	----	10
Purpura simplex	----	1	----	1	----	----	----	----	----	----	----	4
Other diseases of this class	----	5	1	6	----	----	----	----	----	----	----	51
CLASS IV.												
Diseases of the nervous system.												
Apoplexia	----	5	----	----	1	----	----	----	----	4	----	6
Aphasia	----	2	----	----	2	----	----	----	----	----	----	1
Atrophia muscularis progressiva	----	2	----	----	1	1	----	----	----	----	----	6
Cephalalgia	----	81	2	78	5	----	----	----	----	----	----	207

TABLE VIII.—*Force afloat—Detailed statement, 1898*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided. To hospital.	Invalided. From service.	Invalided. On leave.	Invalided. To Government Hospital for Insane.	Deserted.	Died.	Continued to next year.	Total number of sick days.
CLASS IV—continued.												
Diseases of the nervous system—Continued.												
Chorea		2	1	3								10
Dementia		21	2	6	15	1		1				167
Encephalitis		1			1							25
Epilepsia	1	67	15	28	45	8				1	1	448
Febris continua simplex	3	284	14	263	28						10	1,669
Febris ephemera		293	6	294	2						3	914
Febris thermica		80	8	79	8	1						367
Hemicrania		6		5	1							15
Hemiplegia		3			3							6
Insomnia		4		4								6
Irritatio spinalis	1				1							33
Mania		17	4	3	16	1		1				90
Melancholia		33	10	11	28		1				3	413
Meningitis		6	3		8					1		37
Monoplegia		3		1	2							18
Nausea marina		95	14	97	10	1	1					345
Neuralgia		162	8	162	7	1						589
Neurasthenia		76	15	39	39	6	3				4	612
Neuritis		8	2	7	3							67
Neuritis multiplex		1		1								6
Neurosis hysteroidea		11	6	10	2	4					1	83
Paranoia		5	1		5	1						30
Prostratio thermica		423	16	422	11	5	1					1,353
Sciatica	2	33	8	32	10						1	346
Sclerosis multiplex		1			1							16
Syncope		12		11		1						51
Torticollis spasmodica		5		5								14
Vertigo		53	5	45	11	2						218
Other diseases of this class		1			1							0
CLASS V.												
Diseases of the visual apparatus.												
Amaurosis		2	2	2	2							70
Amblyopia		4		1	2	1						26
Asthenopia		6	2	2	5	1						55
Astigmatismus		2		1	1							9
Blepharitis		1			1							2
Chalazion		1		1								4
Choroiditis		1		1								26
Conjunctivitis	2	106	12	98	19	1					2	649
Corneæ ulcus		6		5	1							38
Hordeolus		4		4								10
Hypermetropia		2		1							1	5
Iritis	2	17	5	17	6						1	237
Keratitis	1	7		6	2							51
Myopia		5		3	1	1						38
Neuritis optica		5		2	3							8
Obstructio lacrimalis		2		1	1							0
Pterygium		2		2								8
Retinitis		7	3	2	8							120
Synechia		1			1							0
Trachoma		1			1							0
Other diseases of this class	1	3		2	2							57
CLASS VI.												
Diseases of the auditory apparatus.												
Myringitis		2		2								3
Otalgia		14	1	14	1							81
Otitis externa		40	7	43	4							200
Otitis media	1	81	14	73	23							609
Surditas		6		5	1							8
Other diseases of this class		7		6	1							38

TABLE VIII.—*Force afloat—Detailed statement, 1898*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for insane.				
CLASS VII.												
Diseases of the olfactory apparatus.												
Antri abscessus		1			1							0
Catarrhus æstivus		2		2								10
Rhinitis acuta		84		84								204
Rhinitis chronica	1	5	1	2	5							82
Other diseases of this class		2		1	1							4
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.												
Subsidiary Class I.—Diseases of the digestive apparatus.												
Adenitis salivosa		5		3	2							71
Ani prolapsio		5		3	2							48
Ani rhagades	1	5	2	3	5							37
Appendicitis		36	6	13	24					2	3	215
Catarrhus gastricus acutus		162	3	152	13							577
Catarrhus gastricus chronicus	3	30	4	23	10	2	2					339
Catarrhus intestinalis acutus		271	11	253	25	1	1			1	1	1,385
Catarrhus intestinalis chronicus		17	4	13	8							221
Cholelithiasis		13	4	14	3							85
Colica	1	276	5	275	6				1			819
Constipatio	1	136	4	134	5	1					1	380
Dentis caries	1	10		9	2							27
Diarrhœa simplex		807	24	809	20	1					1	2,666
Dyspepsia nervosa		26	3	18	11							93
Fistula in ano		11	4	6	9							87
Gastralgia		22	1	22			1					101
Hæmatemesis		4		3	1							37
Hæmorrhois		102	7	69	38						2	399
Hepatis congestio		92	5	93	3		1					285
Hepatitis acuta		5		5								40
Hepatitis chronica		4		3						1		34
Hepatitis suppurativa	1	2	1	1	3							55
Hypertrophia tonsillaris		1		1								1
Icterus	1	37	2	27	12						1	262
Obstructio intestinalis		3		1	1					1		11
Odontalgia		12		11	1							34
Parulis		5		5								24
Periodontitis		7		7								32
Periproctitis		2		1	1							29
Peritonitis		2		1							1	24
Pharyngitis		110	3	109	2	1					1	334
Stomatitis		5		5								23
Tonsillitis	7	679	18	673	24				1		6	2,665
Typhlitis		4	1	5								39
Ulcus gastricum		3			3							13
Other diseases of this class		2		1	1							23
Subsidiary Class 2—Diseases of the circulatory apparatus.												
A—Blood vessels:												
Aneurysma		3	2		4					1		27
Angina pectoris		5	1	1	4					1		96
Arteriosclerosis		5	3		7						1	101
Cordis dilatatio		1			1							1
Cordis hypertrophia		4	1	1	2	1	1					6
Cordis palpitatio		26	6	18	13	1						114
Cordis valvularum morbus		20	4	9	13	2						106
Embolismus		1								1		1
Myocarditis		2	1	1	2							12
Pericarditis		2		1		1						5
Phlebitis		3		2	1							14
Varix		12		4	7	1						89

TABLE VIII.—*Force afloat—Detailed statement, 1898*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS—c't'd.												
Subsidiary Class 2—Diseases of the circulatory apparatus—Continued.												
B—Lymphatics:												
Lymphadenitis	1	79	9	66	19	----	----	----	----	----	4	1,247
Lymphangitis	1	5	------	4	2	----	----	----	----	----	----	104
Other diseases of this class	-----	3	------	1	2	----	----	----	----	----	----	9
Subsidiary Class 3—Diseases of the respiratory apparatus.												
Asthma	-----	18	5	13	7	3	----	----	----	----	----	152
Bronchopneumonitis	-----	20	3	6	14	----	----	----	----	1	2	172
Bronchitis acuta	4	675	38	663	50	----	----	----	----	----	4	3,581
Bronchitis chronica	-----	68	5	40	31	1	----	----	----	----	1	414
Catarrhus bronchialis	2	381	11	363	29	1	----	----	----	----	1	1,454
Emphysema pulmonalis	-----	3	------	2	1	----	----	----	----	----	----	10
Hæmoptysis	1	15	3	4	12	1	----	----	----	----	2	181
Laryngitis acuta	1	44	------	44	------	----	----	----	----	----	1	201
Laryngitis chronica	-----	4	------	-------	4	----	----	----	----	----	----	6
Œdema pulmonalis	-----	1	------	-------	1	----	----	----	----	----	----	2
Pleuritis acuta	-----	53	4	40	16	----	----	----	----	----	1	460
Pleuritis chronica	-----	10	2	4	8	----	----	----	----	----	----	199
Pleuritis purulenta	-----	1	------	-------	1	----	----	----	----	----	----	0
CLASS IX.												
Diseases of the motory apparatus.												
Ankylosis	-----	6	------	1	3	2	----	----	----	----	----	31
Arthritis	-----	20	------	9	11	----	----	----	----	----	----	130
Arthritis deformans	-----	2	1	2	1	----	----	----	----	----	----	18
Bursitis	-----	27	1	25	2	----	----	----	----	----	1	231
Caries	-----	3	------	1	2	----	----	----	----	----	----	48
Myalgia acuta	6	391	13	381	25	----	----	----	----	----	4	1,962
Myalgia chronica	-----	47	5	30	20	2	----	----	----	----	----	356
Necrosis	-----	5	1	2	4	----	----	----	----	----	----	19
Osteomyelitis	-----	1	------	-------	1	----	----	----	----	----	----	46
Periostitis	1	20	3	19	3	1	----	----	----	----	1	241
Synovitis	1	65	5	53	17	----	----	----	----	----	1	500
Thecitis	-----	14	2	13	2	----	----	----	----	----	1	123
Other diseases of this class	1	3	------	2	1	1	----	----	----	----	----	30
CLASS X.												
Diseases of the cutaneous apparatus.												
Abscessus	2	503	23	502	17	----	----	----	----	----	9	3,685
Acne	-----	5	------	4	1	----	----	----	----	----	----	18
Carbunculus	2	16	2	18	2	----	----	----	----	----	----	216
Cellulitis	-----	50	4	43	9	----	----	----	----	----	2	414
Clavus	-----	10	------	9	------	1	----	----	----	----	----	55
Cutis fissuræ	-----	7	------	7	------	----	----	----	----	----	----	81
Ecthyma	-----	6	3	5	4	----	----	----	----	----	----	75
Eczema	1	40	14	49	6	----	----	----	----	----	----	469
Erythema	-----	22	2	22	2	----	----	----	----	----	----	140
Furunculus	-----	261	11	266	2	1	----	----	----	----	3	1,492
Herpes simplex	-----	8	1	9	------	----	----	----	----	----	----	38
Herpes zoster	-----	4	------	4	------	----	----	----	----	----	----	37
Impetigo	-----	2	------	2	------	----	----	----	----	----	----	39
Lichen	-----	29	2	31	------	----	----	----	----	----	----	148
Onychia	-----	10	------	9	1	----	----	----	----	----	----	61
Paronychia	-----	35	3	37	1	----	----	----	----	----	----	273
Pemphigus	-----	27	3	26	4	----	----	----	----	----	----	255
Psoriasis	-----	2	3	5	------	----	----	----	----	----	----	20
Ulcus	-----	97	22	69	21	1	----	----	----	----	1	1,428

TABLE VIII.—*Force afloat—Detailed statement, 1898*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided. To hospital.	Invalided. From service.	Invalided. On leave.	Invalided. To Government Hospital for Insane.	Deserted.	Died.	Continued to next year.	Total number of sick days.
CLASS X—continued.												
Diseases of the cutaneous apparatus—Continued.												
Unguis involutus		9		9								50
Uticaria		10		10								49
Verruca		3		2	1							6
Other diseases of this class		10		9	1							41
CLASS XI.												
Venereal diseases and diseases of the genito-urinary apparatus.												
Adenitis inguinalis (venereal)	13	339	46	257	118	1			1		21	5,596
Arthritis gonorrhoica	2	33	5	19	20						1	715
Balanitis		13		10	3							157
Chancroid	2	187	21	155	53						2	2,200
Cystitis	1	53	8	31	27	2					2	411
Enuresis		10	1	3	6				1		1	54
Epididymitis	5	127	18	123	24						3	1,702
Gonorrhœa	9	369	30	298	97	6			1		6	2,375
Hæmaturia		5		2	3							51
Hydrocele		7		4	3							34
Nephritis acuta		10	1	9	1					1		46
Nephritis chronica		14	5	3	13	2				1		138
Nephrolithiasis		3		3								13
Ophthalmia gonorrhoica		9	1	5	5							114
Orchitis	6	150	18	128	38	1					7	1,555
Paraphimosis		12		12								83
Phimosis		32	3	29	5						1	267
Prostatitis		4	2	5	1							130
Pyelitis		1		1								5
Syphilis consecutiva		257	78	196	117	10				1	11	2,619
Syphilis primitiva		65	7	43	24	1					4	729
Urethræ strictura		45	7	29	23							205
Urethritis simplex		3		3								3
Urina suppressa		2		1	1							4
Urinæ retentio		4		2	2							11
Varicocele		18	1	8	8	2	1					80
Verruca acuminata		4		4								12
Other diseases of this class		5		2	2	1						35
CLASS XII.												
Cysts and new growths.												
Angeioma		1		1								21
Carcinoma		1			1							1
Chondroma		1			1							13
Cystis		7		6	1							32
Epithelioma		3			3							8
Fibroma		3		2	1							10
Lipoma		2		1	1							10
Myxoma		1		1								10
Sarcoma		2		1	1							9
CLASS XIII.												
Injuries.												
Abrasio		68	4	70							2	361
Ambustio ex calore	4	225	10	208	24					6	1	2,198
Asphyxia		14		11						3		31
Asphyxia ex submersione		268								268		265
Concussio		22	1	21	2							163
Contusio	2	759	23	728	46	2					8	4,597
Deformitas		6	1	1	3	2					1	51
Fames		1			1							5

TABLE VIII.—*Force afloat—Detailed statement, 1898*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS XIII—continued.												
Injuries—Continued.												
Fractura	2	188	24	101	96	2				3	12	2,756
Fulminis ictus		2		2								6
Hernia	3	127	40	52	106	10					2	1,042
Ictus electricus		1		1								2
Luxatio	2	27	5	23	10						1	287
Membranæ tympani ruptio		20	4	19	5							98
Membri clades		2		2								63
Musculi ruptio		1		1								10
Visceris ruptio		1		1								2
Sole excoçtus		12	1	13								53
Stremma	7	513	25	507	28	3			1		6	3,519
Virium defectio		9	1	6	3	1						63
Vulnus contusum	3	297	15	296	14				1		4	2,499
Vulnus incisum	3	222	5	217	13							1,497
Vulnus laceratum	8	345	10	331	23	1				1	7	3,070
Vulnus punctum		98	5	96	5						2	666
Vulnus sclopeticum		58	34	26	53					13		1,079
Other diseases of this class		3		2	1							3
CLASS XIV.												
Extraneous bodies.												
Corpus extraneum		8	1	7	2							25
CLASS XV.												
Poisons.												
Alcoholismus	1	205	2	185	16					4	3	546
Dermatitis venenata		9	1	10								37
Venenum irritans		23		22						1		57
Venenum neuroticum		7		6						1		15
Vulnus venenatum		44		41	1						2	321
Other diseases of this class		1		1								11
CLASS XVI.												
Feigned diseases.												
Monoplegia		2		2								6
Myalgia		1		1								9
Total	148	17,156	1,317	15,094	2,790	122	19	2	9	333	252	109,867

TABLE IX.—*Navy-yards and other shore stations—General aggregate, 1898.*

Classification of diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
Class I.												
Parasites and parasitic diseases	----	3	----	2	1	----	----	----	----	----	----	7
Class II.												
General infectious diseases (non-venereal)	3	789	64	563	245	----	2	----	1	4	41	4,287
Class III.												
Constitutional disorders of nutrition	----	15	2	13	4	----	----	----	----	----	----	89
Class IV.												
Diseases of the nervous system	1	155	7	129	31	1	----	----	----	1	1	750
Class V.												
Diseases of the visual apparatus	4	63	15	67	11	----	----	----	----	----	4	489
Class VI.												
Diseases of the auditory apparatus	----	15	1	12	4	----	----	----	----	----	----	50
Class VII.												
Diseases of the olfactory apparatus	----	18	----	17	1	----	----	----	----	----	----	39
Class VIII.												
Diseases of the nutritive apparatus:												
Subsidiary class 1—												
Diseases of the digestive apparatus	1	446	5	364	83	----	1	----	----	2	2	1,610
Subsidiary class 2—												
Diseases of the circulatory apparatus	----	20	1	9	10	----	----	----	----	2	----	85
Subsidiary class 3—												
Diseases of the respiratory apparatus	4	281	4	222	59	2	----	----	----	1	5	1,252
Class IX.												
Diseases of the motory apparatus	1	51	2	49	5	----	----	----	----	----	----	345
Class X.												
Diseases of the cutaneous apparatus	2	139	6	121	24	----	1	----	----	----	1	909
Class XI.												
Venereal diseases and diseases of the genito-urinary apparatus	1	273	16	98	181	3	1	----	----	1	6	1,187
Class XII.												
Cysts and new growths	----	4	----	2	2	----	----	----	----	----	----	14
Class XIII.												
Injuries	2	392	10	314	74	1	2	----	----	6	7	2,596
Class XIV.												
Extraneous bodies	----	1	----	----	1	----	----	----	----	----	----	3
Class XV.												
Poisons	----	49	----	29	19	----	----	----	----	1	----	108
Total	19	2,714	133	2,011	755	7	7	----	1	18	67	13,820

TABLE X.—*Navy-yards and other shore stations—Detailed statement, 1898.*

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS I.												
Parasites and parasitic diseases.												
Tænia		1			1							3
Tinea tricophytina		2		2								4
CLASS II.												
General infectious diseases (non-venereal).												
Cachexia malarialis		14	2	13	2						1	132
Catarrhus epidemicus	1	192	3	127	33		1				35	718
Cholera morbus		4		3	1							7
Dysenteria acuta		13		9	4							89
Febris enterica		4		1	2					1		67
Febris flava		23		20	3							310
Febris intermittens	1	210	43	183	70						1	962
Febris pneumonica		14		4	5		1			2	2	185
Febris recurrens		1			1							1
Febris remittens		75	8	49	34							346
Morbilli		23		12	11							242
Neuritis endemica		3			3							1
Paralysis ascendens acuta		1									1	58
Parotitis epidemica		6		2	4							5
Rheumatismus articularis acutus		43	5	34	14							449
Rheumatismus articularis chronicus		12	1	9	3						1	127
Rubella		5			5							0
Scarlatina		36			36							0
Tuberculosis pneumonica acuta		2	1	1	1					1		51
Tuberculosis pneumonica chronica		8			7				1			22
Typhus		2		1	1							33
Vaccina	1	97	1	94	5							477
Varicella		1		1								5
CLASS III.												
Constitutional disorders of nutrition.												
Anæmia		8		5	3							48
Debilitas senilis		3		2	1							11
Lithæmia		4	2	6								30
CLASS IV.												
Diseases of the nervous system.												
Apoplexia		1			1							3
Cephalalgia		53		53								90
Epilepsia		7		4	2	1						32
Febris continua simplex		18		14	4							92
Febris ephemera		3		3								7
Hemicrania		2		2								3
Hemiplegia		2		1	1							53
Insomnia		1		1								1
Mania		3		2	1							24
Melancholia		7	1	1	7							13
Meningitis		1								1		25
Monoplegia		1			1							5
Neuralgia		19	2	18	3							41
Neurasthenia		12	2	10	4							271
Neuritis		3		3								3
Neurosis hysteroidea		1			1							3
Paranoia		1			1							4
Prostratio thermica		9	1	9	1							19
Sciatica	1	3		2	1						1	34
Vertigo		7	1	5	3							22
Other diseases of this class		1		1								5

TABLE X.—*Navy-yards and other shore stations—Detailed statement, 1898*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS V.												
Diseases of the visual apparatus.												
												2
Achromatopsia		1	1	2								4
Asthenopia	2	18	10	29							1	169
Astigmatismus	1	5	2	8								7
Blepharitis		1			1							
Chalazion		1		1								7
Conjunctivitis		23	1	18	5						1	111
Hordeolus		1			1							
Hypermetropia	1			1								17
Iritis		4		2	1						1	70
Keratitis		1			1							1
Myopia		4	1	5								17
Neuritis optica		1			1							
Retinitis		1			1							12
Trachoma		1									1	3
Other diseases of this class		1		1								6
CLASS VI.												
Diseases of the auditory apparatus.												
Otalgia		1		1								4
Otitis externa		2	1	2	1							8
Otitis media		5		4	1							8
Surditas		7		5	2							30
CLASS VII.												
Diseases of the olfactory apparatus.												
Rhinitis acuta		14		14								27
Rhinitis chronica		3		2	1							8
Other diseases of this class		1		1								4
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.												
Subsidiary Class 1.—Diseases of the digestive apparatus.												
Ani rhagades		1	1	1	1							6
Appendicitis		6		5						1		96
Catarrhus gastricus acutus		30	1	28	3							89
Catarrhus gastricus chronicus		6	1	6	1							74
Catarrhus intestinalis acutus		17		15	2							34
Catarrhus intestinalis chronicus		4		1	2		1					38
Colica		17		15	2							27
Constipatio		27		26	1							53
Diarrhœa simplex		107	1	100	8							302
Dyspepsia nervosa		4		3	1							24
Fistula in ano		1		1								65
Gastralgia		23		23								61
Hæmorrhois		12		8	4							61
Hepatis congestio		2		2								11
Hepatitis acuta		1			1							
Icterus		5		4	1							89
Odontalgia		8		8								13
Parulis		2		2								10
Peritonitis		2								1	1	6
Pharyngitis		35		31	4							102
Tonsillitis	1	133	1	84	50						1	435
Typhlitis		1		1								11
Other diseases of this class		2			2							

TABLE X.—*Navy-yards and other shore stations—Detailed statement, 1898*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS—cont'd.												
Subsidiary Class 2.—Diseases of the circulatory apparatus.												
A—Blood vessels:												
Angina pectoris		2		1	1							4
Cordis palpitatio		2		2								3
Cordis valvularum morbus		4		1	1					2		5
Phlebitis		1			1							
Varix		2			2							3
B—Lymphatics:												
Lymphadenitis		7	1	4	4							69
Lymphangitis		2		1	1							1
Subsidiary Class 3.—Diseases of the respiratory apparatus.												
Asthma		5	2	3	2	2						67
Bronchopneumonitis		2			1					1		3
Bronchitis acuta	1	88		54	32						3	302
Bronchitis chronica		7		3	4							31
Catarrhus bronchialis	3	153	1	144	11						2	710
Emphysema pulmonalis		1		1								3
Hæmoptysis		4		1	3							4
Laryngitis acuta		9	1	10								74
Laryngitis chronica		2		2								11
Pleuritis acuta		9		4	5							47
Pleuritis chronica		1			1							
CLASS IX.												
Diseases of the motory apparatus.												
Arthritis		2		1	1							9
Bursitis		2		1	1							11
Myalgia acuta	1	40	2	42	1							206
Myalgia chronica		1		1								70
Synovitis		4		2	2							24
Thecitis		2		2								25
CLASS X.												
Diseases of the cutaneous apparatus.												
Abscessus		48	2	39	9		1				1	386
Acne		1			1							1
Carbunculus		4		3	1							49
Cellulitis		6		4	2							12
Clavus		3		3								17
Ecthyma		2		2								43
Eczema		7	3	8	2							30
Erythema		4		4								12
Furunculus	1	40	1	37	5							158
Herpes zoster	1	2		2	1							38
Lichen		2		2								18
Paronychia		3		3								20
Psoriasis		2		2								24
Ulcus		6		4	2							36
Unguis involutus		6		6								62
Urticaria		2		1	1							1
Verruca		1		1								2
CLASS XI.												
Venereal diseases and diseases of the genito-urinary apparatus.												
Adenitis inguinalis (venereal)		18		6	9						3	181
Arthritis gonorrhoica	1	1				2						34
Balanitis		1		1								20
Calculus		1		1								1
Chancroid		31	2	15	18							97
Cystitis		8		2	6							45

TABLE X.—*Navy-yards and other shore stations—Detailed statement, 1898*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided. To hospital.	Invalided. From service.	Invalided. On leave.	Invalided. To Government Hospital for Insane.	Deserted.	Died.	Continued to next year.	Total number of sick days.
CLASS XI—continued.												
Venereal diseases and diseases of the genito-urinary apparatus—C't'd.												
Enuresis		5			5							5
Epididymitis		8		3	5							95
Fistula urinalis		1			1							5
Gonorrhœa		129	7	36	99						1	292
Hydrocele		1	1	1	1							5
Nephritis acuta		1	1							1	1	21
Nephritis chronica		1		1								1
Nephrolithiasis		5		4			1					30
Orchitis		10		5	5							30
Paraphimosis		2		1	1							2
Phimosis		2		1	1							7
Prostatitis		1		1								10
Syphilis consecutiva		23	4	11	16							78
Syphilis primitiva		6		1	5							13
Urethræ strictura		11	1	6	5						1	191
Urinæ retentio		1			1							
Varicocele		5		2	2	1						24
Other diseases of this class		1			1							
CLASS XII.												
Cysts and new growths.												
Cystis		2		1	1							8
Epithelioma		1			1							
Lipoma		1		1								6
CLASS XIII.												
Injuries.												
Abrasio		19		19								72
Ambustio ex calore		12		11	1							101
Ambustio ex frigore		2		1	1							8
Contusio		74	1	64	11							424
Deformitas		2		1	1							22
Fractura	1	30	1	12	15		1			1	3	469
Hernia		14	2	6	9	1						95
Luxatio		8		7	1							93
Sole excoctus		9		8	1							33
Stremma	1	76		71	6							426
Virium defectio		1		1								3
Vulnus contusum		35	1	33	3							144
Vulnus incisum		31		25	3						3	186
Vulnus laceratum		36		33	1		1				1	284
Vulnus punctum		16	1	14	3							109
Vulnus sclopeticum		27	4	8	18					5		127
CLASS XIV.												
Extraneous bodies.												
Corpus extraneum		1			1							3
CLASS XV.												
Poisons.												
Alcoholismus		38		23	15							69
Dermatitis venenata		4		3	1							21
Venenum irritans		1		1								10
Venenum neuroticum		1								1		1
Vulnus venenatum		4		2	2							7
Other diseases of this class		1			1							0
Total	19	2,714	133	2,011	755	7	7		1	18	67	13,820

TABLE XI.—*Naval hospitals—General aggregate, 1898.*

Classification of diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
Class I.												
Parasites and parasitic diseases	----	4	9	11	----	----	1	----	----	----	1	409
Class II.												
General infectious diseases (non-venereal)	39	61	921	724	27	125	11	----	6	37	91	28,205
Class III.												
Constitutional disorders of nutrition	3	2	34	18	2	14	----	----	1	1	3	1,095
Class IV.												
Diseases of the nervous system	14	12	247	113	11	95	11	18	6	8	11	8,135
Class V.												
Diseases of the visual apparatus	4	2	66	32	6	23	3	----	----	----	8	2,786
Class VI.												
Diseases of the auditory apparatus	1	1	34	15	2	14	----	----	----	----	5	911
Class VII.												
Diseases of the olfactory apparatus	----	----	5	1	----	4	----	----	----	----	----	227
Class VIII.												
Diseases of the nutritive apparatus:												
Subsidiary class 1—Diseases of the digestive apparatus	9	16	286	225	12	35	7	----	3	5	24	7,393
Subsidiary class 2—Diseases of the circulatory apparatus	13	5	81	36	4	46	----	----	----	8	5	4,099
Subsidiary class 3—Diseases of the respiratory apparatus	11	5	225	169	11	35	1	----	1	----	24	6,406
Class IX.												
Diseases of the motory apparatus	9	2	89	51	5	29	1	----	1	----	13	3,402
Class X.												
Diseases of the cutaneous apparatus	13	10	87	76	2	19	1	----	1	----	11	3,845
Class XI.												
Venereal diseases and diseases of the genito-urinary apparatus	98	62	776	609	26	155	1	----	8	6	131	35,985
Class XII.												
Cysts and new growths	2	4	11	8	2	----	----	----	----	5	2	865
Class XIII.												
Injuries	26	25	437	256	28	136	4	----	3	1	60	19,325
Class XIV.												
Extraneous bodies	----	----	3	2	----	----	----	----	----	----	1	78
Class XV.												
Poisons	2	1	42	37	----	5	----	----	----	1	2	852
Total	244	212	3,353	2,383	138	735	41	18	30	72	392	124,018

TABLE XII.—*Naval hospitals—Detailed statement, 1898.*

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS I.												
Parasites and parasitic diseases.												
Scabies		2	5	6							1	233
Tænia		2	3	5								161
Tinea trichophytina			1				1					15
CLASS II.												
General infectious diseases (non-venereal).												
Cachexia malarialis			23	12	1	4	2				4	623
Catarrhus epidemicus	2	1	98	73	6	5	1				16	1,750
Cholera morbus			2	2								27
Diphtheria		5	2	5						2		177
Dysenteria acuta		1	18	14	3	1					1	426
Dysenteria chronica			5	3		1	1					267
Erysipelas			6	4							2	167
Febris cerebro-spinalis		1								1		25
Febris enterica	9	17	77	72	2	4				8	17	4,030
Febris flava			1	1								72
Febris intermittens		3	105	97	1	8					2	1,895
Febris pneumonica	5	9	41	35		1	1			8	10	1,587
Febris recurrens			2	2								47
Febris remittens	1	4	134	109	8	5	3		1	1	12	3,632
Morbilli		1	92	89							4	1,613
Parotitis epidemica	3		55	51					3		4	935
Pyæmia			1							1		1
Rheumatismus articularis acutus	5		57	45		9				1	7	2,317
Rheumatismus articularis chronicus	6	5	46	26	2	25					4	1,953
Rubella			18	18								406
Scarlatina		1	37	33					2		3	1,340
Septicæmia		1	2	2						1		83
Tuberculosis miliaris acuta		1								1		10
Tuberculosis pneumonica acuta	2	2	32	9	1	20	1			3	2	1,396
Tuberculosis pneumonica chronica	6	6	59	13	3	42	2			9	2	3,236
Tuberculosis of other parts		2	1	2						1		59
Vaccina			7	6							1	97
Variola		1		1								34
CLASS III.												
Constitutional disorders of nutrition.												
Anæmia	1	1	16	9	1	6			1		1	500
Debilitas senilis	2		7	5		4						161
Diabetes insipidus			3	1		2						148
Diabetes mellitus		1	2	1		1				1		30
Lithæmia			4	1	1						2	213
Pseudoleucocythæmia			1			1						22
Purpura hæmorrhagica			1	1								21
CLASS IV.												
Diseases of the nervous system.												
Apoplexia			2			1				1		302
Aphasia			1								1	12
Atrophia muscularis progressiva			1			1						37
Cephalalgia		1	7	7		1						167
Dementia			12	3		4		5				219
Encephalitis			2							2		24
Epilepsia	1	3	40	4	2	35			2		1	958
Febris continua simplex	2		23	18	2	2			1		2	700
Febris ephemera			3	3								21
Febris thermica			2	2								53
Hemiplegia	4		6	2	2	3	1			1	1	940

TABLE XII.—*Naval hospitals—Detailed statement, 1898*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS IV—continued.												
Diseases of the nervous system—Continued.												
Irritatio spinalis	1		1	1		1						170
Mania			13	6	1	3		3				367
Melancholia	1	3	27	6	1	16		8				786
Meningitis		1	5	2						4		111
Monoplegia	1		5	4	1						1	192
Nausea marina			4	2		2						41
Neuralgia			14	9	1	4						397
Neurasthenia		3	34	14		11	8		2		2	1,150
Neuritis	1		3	2		1					1	149
Neurosis hysteroidea		1	1	1	1							23
Paralysis agitans			1	1								43
Paranoia			5	1		1		2			1	114
Paraplegia	1					1						91
Prostratio thermica			11	9		1	1					262
Sciatica	1		7	4		2	1		1			285
Sclerosis lateralis spastica	1			1								161
Sclerosis multiplex			1			1						34
Vertigo			14	10		3					1	282
Other diseases of this class			2	1		1						44
CLASS V.												
Diseases of the visual apparatus.												
Amaurosis			1			1						25
Amblyopia			3		1	2						147
Asthenopia			5			2	2				1	129
Astigmatismus			1			1						13
Blepharitis			2	2								70
Choroiditis		1	1			1					1	47
Conjunctivitis			23	16	2	4					1	745
Corneæ ulcus	2		2	3		1						232
Dacryocystitis		1	1	1		1						58
Entropium			1			1						21
Hordeolus			1	1								5
Iritis			5	2		2					1	342
Keratitis			3	2							1	152
Myopia	1		2	1	1						1	113
Neuritis optica			4	3							1	274
Obstructio lacrimalis			1	1								71
Retinitis	1		9		1	7	1				1	329
Trachoma			1		1							13
CLASS VI.												
Diseases of the auditory apparatus.												
Otitis externa			5	2	1	2						69
Otitis media	1		23	11	1	8					4	733
Surditas		1	4	1		3					1	74
Other diseases of this class			2	1		1						35
CLASS VII.												
Diseases of the olfactory apparatus.												
Antri abscessus			1			1						61
Rhinitis chronica			4	1		3						166
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.												
Subsidiary Class 1.—Diseases of the digestive apparatus.												
Ani prolapsio	1		1			2						149
Ani rhagades			6	6								241
Appendicitis		3	22	12	2	5	1			2	3	673

TABLE XII.—*Naval hospitals—Detailed statement, 1898*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS—cont'd.												
Subsidiary Class 1.—Diseases of the digestive apparatus—Continued.												
Catarrhus gastricus acutus		1	12	11		2						268
Catarrhus gastricus chronicus		1	12	8		3	2					385
Catarrhus intestinalis acutus			16	13	1		1				1	378
Catarrhus intestinalis chronicus	2	1	7	7						2	1	555
Cholelithiasis		1	4	3	1	1						171
Colica			7	5	1						1	114
Constipatio	1		4	3		2						101
Dentis caries			1	1								75
Diarrhoea simplex		2	28	26	1	2					1	386
Dyspepsia nervosa			10	4		2	2		1		1	141
Fistula in ano		3	8	6	1				1		3	322
Hæmatemesis		1	1	2								23
Hæmorrhois	1		42	28		10	1		1		3	1,470
Hepatis congestio	1		2	2	1							37
Hepatitis acuta			1	1								5
Hepatitis chronica		1								1		29
Hepatitis suppurativa			1			1						16
Icterus	1		12	10	1	1					1	293
Obstructio intestinalis		1	2	2	1							63
Odontalgia			2		1	1						17
Periproctitis			1			1						47
Peritonitis			1	1								10
Pharyngitis			6	6								29
Tonsilitis	2		72	64	1	1						1,062
Ulcus gastricum		1	4	3		1					1	320
Other diseases of this class			1	1								13
Subsidiary Class 2.—Diseases of the circulatory apparatus.												
A—Blood vessels:												
Aneurysma	3	2	3	1	1	3				2	1	688
Angina pectoris	1		5	3		2				1		153
Arteriosclerosis			3	1		1				1		56
Cordis dilatatio			1			1						21
Cordis hypertrophia			1			1						70
Cordis palpitatio	2	1	16	3	1	15						614
Cordis valvularum morbus	2		17	2		13				3	1	775
Endocarditis		2				1				1		21
Myocarditis			2	1		1						101
Phlebitis			1	1								70
Varix			8	3		5						119
B—Lymphatics:												
Lymphadenitis	5		23	21	1	3						1,396
Other diseases of this class			1		1							15
Subsidiary Class 3.—Diseases of the respiratory apparatus.												
Asthma	1	1	7	2	1	5					1	192
Bronchopneumonitis			16	7	3	3					3	401
Bronchitis acuta	3		85	75	3	4	1				5	1,610
Bronchitis chronica	4	1	32	16		14					7	1,642
Catarrhus bronchialis	2		36	34	2				1		1	735
Emphysema pulmonalis			1								1	20
Hæmoptysis	1		17	10	1	5					2	679
Laryngitis chronica			4	2		1					1	170
Pleuritis acuta		2	20	16	1	2					3	622
Pleuritis chronica		1	6	7								297
Other diseases of this class			1			1						38

TABLE XII—*Naval hospitals—Detailed statement, 1898*—Continued.

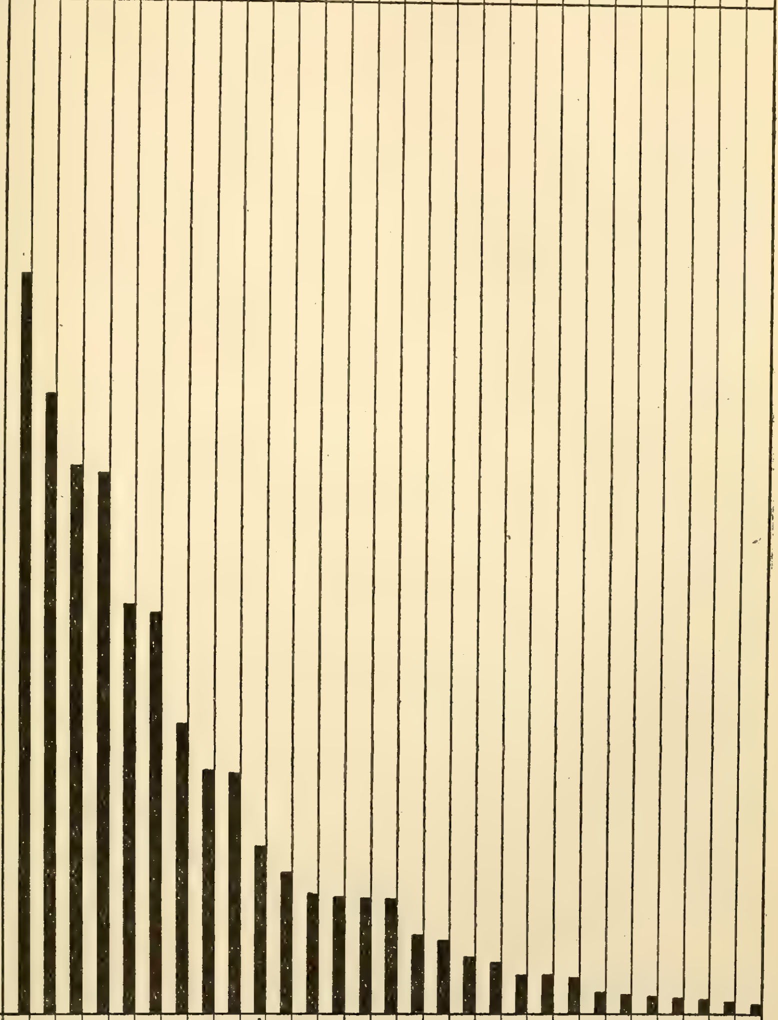
Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS IX.												
Diseases of the motory apparatus.												
Ankylosis	1		3		4							105
Arthritis	1		15	7	2	4			1		2	585
Bursitis			2	1		1						104
Myalgia acuta	2		22	20	2	2						624
Myalgia chronica	3		18	10	1	5	1				4	584
Necrosis	1	1	3	2		1					2	200
Ostitis	1			1								108
Osteomyelitis		1	1	1							1	339
Periostitis			5			4					1	124
Synovitis			18	8		7					3	595
Thecitis			1	1								12
Other diseases of this class			1			1						22
CLASS X.												
Diseases of the cutaneous apparatus.												
Abscessus	2	5	24	22		5					4	921
Acne			1	1								49
Carbunculus			2	2								193
Cellulitis	1		8	7		1					1	308
Clavus	2	1				3						105
Ecthyma			1	1								93
Eczema	1	1	7	5		4						161
Erythema			2	2								41
Furunculus	1		8	9								301
Herpes simplex			1	1								3
Impetigo		1									1	48
Onychia			1						1			33
Paronychia			1								1	62
Pemphigus			3	2		1						180
Ulcus	4	1	22	18	1	4	1				3	992
Unguis involutus	2		1	1	1	1						145
Urticaria			1	1								25
Other diseases of this class		1	4	4							1	185
CLASS XI.												
Venereal diseases and diseases of the genito-urinary apparatus.												
Adenitis inguinalis (venereal)	19	4	126	105	4	11					29	8,048
Arthritis gonorrhoica	10	3	19	19	2	5					6	1,460
Balanitis			1	1								2
Chancroid	10	1	71	58	3	5					16	3,008
Cystitis	2		29	22		5			2		2	885
Enuresis	1	1	11	5		8						300
Epididymitis	2	5	27	26		2					6	1,298
Fistula urinalis	1	1	1	2		1						98
Gonorrhœa	12	5	212	163	7	22			2		35	8,068
Hæmaturia			5	3	1						1	98
Hydrocele		2	4	4	1	1						194
Nephritis acuta		2	3							3	2	193
Nephritis chronica		1	12	7		2	1			3		287
Nephrolithiasis			1	1								19
Ophthalmia gonorrhoica			2	2								98
Orchitis	4	4	50	41	3	7					7	1,666
Paraphimosis			2	2								39
Phimosis	1		4	3		1					1	210
Prostatitis	1	1	1	1		2						143
Pyelitis	1			1								32
Syphilis consecutiva	24	32	125	95	3	62			2		19	6,976
Syphilis primitiva	6		27	25		5			1		2	1,305
Urethræ strictura	4		26	16	2	8			1		3	1,226
Urethritis simplex			2	1							1	63
Urina suppressa			1	1								17

TABLE XII.—*Naval hospitals—Detailed statement, 1898*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS XI—continued.												
Venereal diseases and diseases of the genito-urinary apparatus—C't'd.												
Urinæ retentio			3	2		1						20
Varicocele			9	1		7					1	178
Other disease of this class			2	2								54
CLASS XII.												
Cysts and new growths.												
Chondroma		3	2							5		273
Cystis			2	1							1	99
Epithelioma			3	2							1	231
Fibroma		1	1	2								30
Lipoma			1	1								63
Myxoma	1			1								107
Osteoma	1			1								3
Sarcoma			2		2							59
CLASS XIII.												
Injuries.												
Abrasio			1	1								9
Ambustio ex calore	1	3	14	14		3			1			801
Ambustio ex frigore	1		1	2								62
Concussio			4	2		2						84
Contusio	2	2	55	48	1	7			1		2	1,475
Deformitas	2	1	5	2		6						364
Fractura	6	6	101	54	8	17	1			1	32	6,172
Hernia	7	3	94	32	6	60					6	3,340
Ictus electricus			7			5					2	260
Luxatio		2	12	10							4	524
Membranæ tympani ruptio			1				1					9
Membri clades	1				1							8
Musculi ruptio			1		1							21
Visceris ruptio			1				1					106
Sole excoctus			1	1								6
Stremma	1	3	37	26	2	10			1		2	1,318
Virium defectio		1	9	5		4	1					177
Vulnus contusum	1		12	10		1					2	586
Vulnus incisum	1	2	12	13	2							422
Vulnus laceratum	2	2	16	14		4					2	1,085
Vulnus punctum			7	4							3	303
Vulnus sclopeticum	1		45	18	7	16					5	2,173
Other diseases of this class			1			1						20
CLASS XIV.												
Extraneous bodies.												
Corpus extraneum			3	2							1	78
CLASS XV.												
Poisons.												
Alcoholismus	1	1	36	31		4				1	2	625
Dermatitis venenata	1		1	1								17
Venenum neuroticum			1			1						87
Vulnus venenatum			3	3								48
Other diseases of this class			1	1								75
Total	244	212	3,353	2,383	138	735	41	18	30	72	392	124,018

TABLE XIII.—*Prevalence of special diseases and injuries in the Navy and Marine Corps during the year 1898.*

[Average strength 23038.]



DISEASES.	NUMBER OF ADMISSIONS.
Malarial Diseases.	1606
Bronchial Affections.	1373
Diarrhœal Affections.	1226
Wounds.	1217
Contusions.	835
Tonsillitis.	812
Sprains.	592
Heat Stroke.	512
Gonorrhœa.	503
Articular Rheumatism.	344
Syphilis, Secondary.	312
Alcoholismus.	244
Burns.	240
Fractures.	224
Chancroids.	219
Hernia.	144
Measles.	135
Typhoid Fever.	109
Phthisis.	98
Dysentery.	72
Pneumonia.	72
Syphilis, Primary.	71
Scarlet Fever.	38
Heart Disease, Organic.	33
Nephritis.	29
Yellow Fever.	26
Concussions.	22
Diabetes.	9
Smallpox.	4

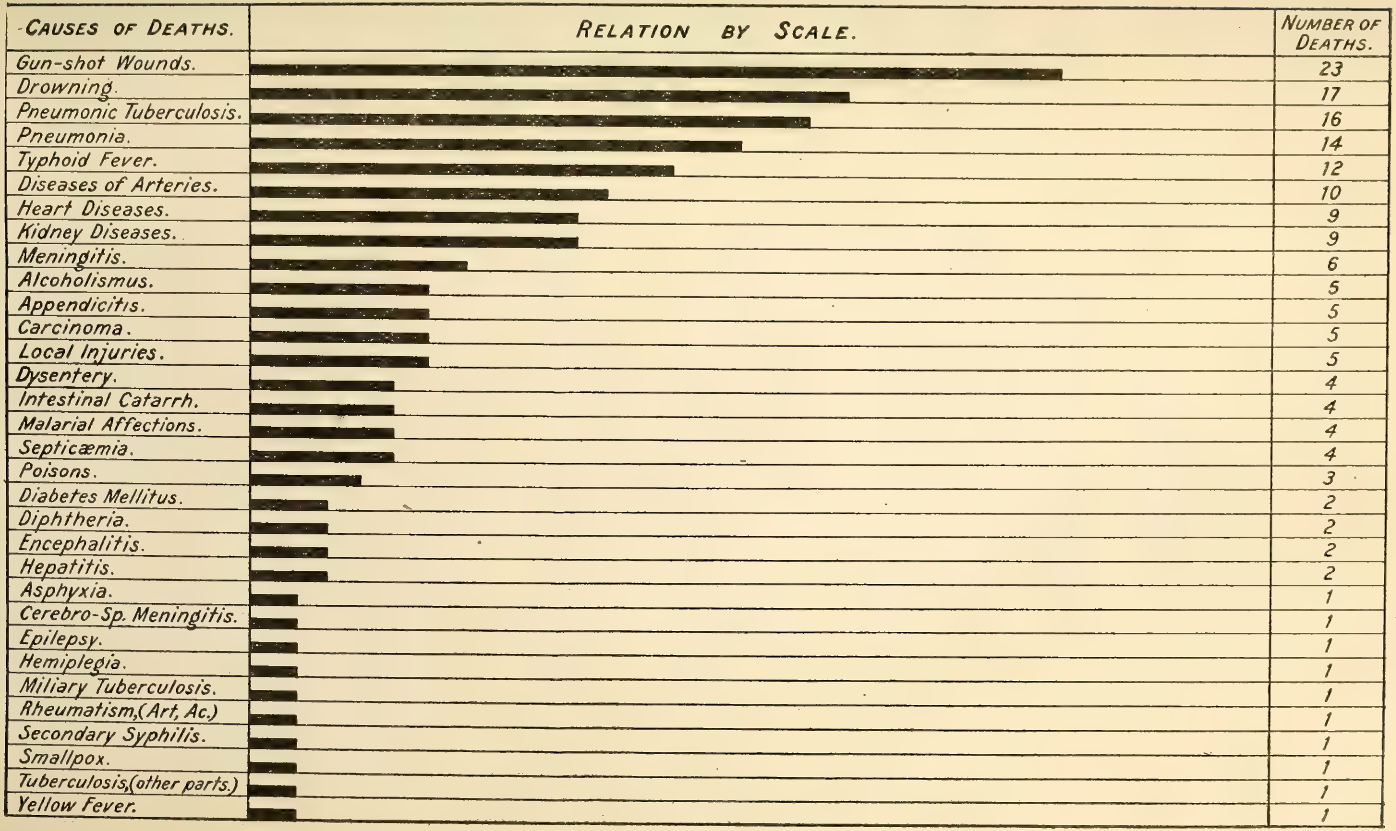
TABLE XIV.—*Mortuary record of the Navy and Marine Corps for the year 1898.*

Cause of death.	Number of deaths.					Average age.
	Hospitals.	Yards and stations.	Vessels.	Elsewhere.	Total.	
Alcoholismus	1		4		5	30.35
Aneurysma	2		1		3	36.61
Angina pectoris	1		1		2	46.45
Apoplexia	1		4		5	42.88
Appendicitis	2	1	2		5	22.86
Arteriosclerosis	1				1	74.17
Asphyxia			1		1	21.58
Asphyxia ex submersione			17		17	25.31
Bronchopneumonitis			1		1	15.42
Carcinoma	5				5	36.28
Catarrhus intestinalis acutus			1		1	20.00
Catarrhus intestinalis chronicus	2				2	56.18
Cordis valvularum morbus	3	2			5	44.76
Diabetes mellitus	1		1		2	32.87
Diphtheria	2				2	23.08
Dysenteria acuta			4		4	25.81
Embolismus			1		1	25.83
Encephalitis	2				2	34.29
Endocarditis	1				1	40.42
Enteritis			1		1	34.83
Epilepsia			1		1	22.08
Febris cerebro-spinalis	1				1	17.17
Febris enterica	8	1	2	1	12	27.20
Febris flava			1		1	38.00
Febris pneumonica	8	3	2		13	35.71
Febris remittens	1		3		4	25.83
Fractura	1	1	2		4	27.64
Hemiplegia	1				1	51.17
Hepatitis chronica	1		1		2	48.88
Meningitis	4	1	1		6	27.39
Myocarditis			1		1	36.58
Nephritis acuta	3		1		4	24.46
Nephritis chronica	3	1	1		5	36.20
Peritonitis		1			1	45.66
Pyæmia	1				1	46.17
Rheumatismus articularis acutus	1				1	33.00
Septicæmia	1		1		2	26.75
Syphilis consecutiva			1		1	29.00
Tuberculosis miliaris acuta	1				1	33.00
Tuberculosis pneumonica acuta	4		1		5	26.26
Tuberculosis pneumonica chronica	8	1	1	1	11	33.01
Tuberculosis (other parts)	1				1	32.75
Variola			1		1	23.00
Venenum irritans			1		1	21.42
Venenum neuroticum		1	1		2	33.16
Vulnus laceratum			1		1	27.83
Vulnus sclopeticum		5	18		23	30.13
Total	72	18	81	2	173	33.03

NOTE.—Deaths on the U. S. S. *Maine* (260) are not included in the above table.

TABLE XV.—*Deaths in the Navy and Marine Corps during the year 1898.*

[Average strength, 23986; total number of deaths, 173; ratio per 1,000 of strength, 7.21]



CAUSES OF DEATHS.	NUMBER OF DEATHS.
Gun-shot Wounds.	23
Drowning.	17
Pneumonic Tuberculosis.	16
Pneumonia.	14
Typhoid Fever.	12
Diseases of Arteries.	10
Heart Diseases.	9
Kidney Diseases.	9
Meningitis.	6
Alcoholismus.	5
Appendicitis.	5
Carcinoma.	5
Local Injuries.	5
Dysentery.	4
Intestinal Catarrh.	4
Malarial Affections.	4
Septicæmia.	4
Poisons.	3
Diabetes Mellitus.	2
Diphtheria.	2
Encephalitis.	2
Hepatitis.	2
Asphyxia.	1
Cerebro-Sp. Meningitis.	1
Epilepsy.	1
Hemiplegia.	1
Miliary Tuberculosis.	1
Rheumatism,(Art, Ac.)	1
Secondary Syphilis.	1
Smallpox.	1
Tuberculosis,(other parts.)	1
Yellow Fever.	1

NOTE.—Deaths on the U. S. S. *Maine* (260) are not included in the above table.

REPORTS ON CRUISING SHIPS.

REPORT ON THE U. S. S. OLYMPIA.

By A. F. PRICE, *Medical Inspector*, *United States Navy.*

During the past year 85 men were examined for enlistment, of which number 73 were accepted and 12 rejected, one of this number being for color-blindness. There were 2 deaths during this year, 1 from drowning. A man fell overboard from the tug *Barcelo* and was drowned. The body was not recovered. One death from acute dysentery on board this ship. The case of aneurysma sent to hospital in Yokohama in 1897 died there during this year. There were 25 cases invalided from the ship, of whom 12 returned to duty.

Venereal diseases during the past year on board this ship have affected 256 individuals, and 338 cases of various forms of this disease have been treated. Of these cases 47 only have been admitted to the sick list. There have been 561 vaccinations during the past year, with a success of 6.239 + per cent.

The general health of the ship's company during the year has been very good. There have been no cases of cholera or variola.

Four cases of measles occurred between April 8–26. They were all of a mild type. They were isolated as much as possible on board ship, and care was taken to sun and air the infected bedding and to disinfect all contaminated portions of the ship. The infection was conveyed on board, it was thought, by Chinese allowed on board at meal hours. This privilege was withdrawn.

Fifty-five cases of a fever, classed as remittent, occurred during the past year. During the prolonged stay of this ship at Hongkong, Chefoo, Yokohama, Shanghai, and Manila, it has always made its appearance. It is not affected by quinine. Abdominal symptoms are slight or absent. There is prostration, loss of flesh and strength, a temperature ranging at times to 106° F., with a slow convalescence, and a tendency to relapse. The duration of the attack varies greatly. Chlorine water continues to give good results. Arsenic in increasing doses is also quite successful. There occurred during the past year a case of acute intestinal catarrh, with subsequently developed ascites and hernia. The patient, while returning home on sick leave, died. The diagnosis was cirrhosis of the liver.

There were no casualties at the battle of Manila Bay, May 1, or when taking the city, on August 13.

Three cases of ambustio ex-calore occurred August 19, due to an explosion of gun cotton, which was being dried in the "galley" oven. The patients had severe burns of first, second, and third degrees, over head, neck, face, arms, forearms, hands, back, legs, and feet. Two were sent to the civil hospital at Hongkong. All three returned to duty without any permanent injury.

There were 2 cases of dysenteria acuta of severe type, one of which died after eight days sickness. On post-mortem examination, the gut up to the ilio-cæcal valve was found congested with follicular ulcers and punctate hæmorrhages. The gut was also thickened and contained a quantity of muco-pus, putrid in character. The other case made a good recovery after nineteen days' sickness.

One case of gonorrhœa of the rectum occurred. The diagnosis was confirmed by microscopic examination. The patient was sent home on a transport.

One case of hernia occurred, due to strain while lifting.

The bubonic plague existed with considerable severity at Hongkong during nearly eight months of this year, only entirely disappearing in September, following the usual course. It is likely again to appear next year. From information gathered from the Hongkong papers, it appears that during May and early in June the epidemic reached its highest point—about 40 cases daily. Quite a number of fatal cases occurred among non-Asiatics. The total number of cases from January 1 to April 23 is given as 554. The disease is extremely fatal in the Chinese, the mortality being from 85 to 95 per cent of those attacked. Europeans are not exempt, but it is thought the rate of mortality is somewhat lower.

There existed during the first quarter of this year an outbreak of smallpox at Hongkong, with 11 as the highest number of new cases in one day. Smallpox also exists among the natives at Manila and Cavite, and to a slight extent among the troops on shore. Venereal diseases are prevalent about Manila and Cavite, and, as in China and Japan, the type is severe and often malignant.

The shores about the bay of Manila, on which Manila and Cavite are built, form a low plain, intersected by streams and ponds. As a consequence there is much marshy land. This accounts for the prevalence of fevers of malarial type. Moreover, the loose soil of Cavite furnishes only water of a brackish nature, which is also contaminated with organic matter. Rain water is used as much as possible, of which quantities are stored in iron tanks about the navy-yard.

Quite necessary is it that a distilling apparatus of sufficient capacity should be established at this naval station. The water supply of Manila is claimed to be fairly good. Typhoid fever, however, prevails in the city, and an occasional case appears on our ships.

Surg. H. T. Percy has investigated the subject of leprosy as far as opportunity has been afforded. He has found that there are 250 cases in the leper hospital at Manila. It has not been found possible to acquire information as to the general distribution of this disease or the details of its management.

It is thought desirable to establish a small hospital at the Cavite Navy Yard for the use of the sick of this squadron. The second floor of a storehouse has been selected, with which is connected a suitable extension at right angles to it, in which the administration and storerooms, as well as several rooms for sick officers, can conveniently be established. The ward can easily accommodate 20 beds.

Several checks for amounts of money ranging from $10 to $500 have been received by the Admiral from charitable individuals and societies at home, who have donated this money to be expended for the comfort of the sick. Luxuries of all kinds have been purchased for this purpose and distributed to the various ships of the squadron in proportion to their complements. There still remains of this money about

$200 in gold, which is being gradually expended for the purpose intended.

In the future it might be advisable to establish a hospital on Corregidor Island, at the mouth of the Bay of Manila. There is a very suitable level space about the light-house, on the top of this island, which space comprises, I should say, 20 acres. It could be made accessible by building a good road from the beach. It is open to winds from every direction, and is about 25 miles by boat from Manila. The height of the island is 579 feet.

REPORT ON THE U. S. S. PHILADELPHIA.

By Dwight Dickinson, *Medical Inspector, United States Navy.*

The *Philadelphia*, a protected cruiser of 4,324 tons displacement, was recommissioned July 9, receiving her officers and crew nine days later.

For about eight months the ship had been undergoing repairs at the navy-yard, Mare Island, Cal. The changes made affecting the medical department were:

First. Shortening the dispensary about 4 feet—that space including a room in the after port sponson, having been added to an "office for the chief engineer."

Second. The placing of a bath tub, provided with hot and cold water, salt and fresh; a water closet; voice tube and electric bell; rings for washstand, in compartment D, No. 113, directly under the captain's cabin. This compartment, formerly the after torpedo room, now called the sick bay, is admirably situated to secure quietness and isolation for the sick: A few cases of measles and mumps appearing at sea were here successfully isolated. The compartment has a cubic air space of 2,390 feet, and can accommodate 10 cots or 24 hammocks. It is ventilated by a standing ventilator connected by a **Y** to one from the steering engine room to the poop deck, also by two 4-inch louvres in main ventilating pipe on each side. It has four air ports.

Third. A hatchway has been cut in the port passageway forward from the ward room, giving access to the sick bay from the berth deck, through the engineer machine shop, reserve coal bunkers, and passage between after storerooms.

The changes affecting the ventilation of the ship are the installation of independent blowers in the engine room and dynamo room, one No. 4 "Monogram" electric fan being placed in the forward engine hatch and one No. 4 "Monogram" electric fan in the after engine hatch.

The fan in the forward engine hatch takes the air from the ventilator on the port side of the forward engine hatch, between frames Nos. 38 and 39, and discharges through a duct, from which branches lead to the various parts of the forward engine room.

The fan in the after engine hatch takes the air from the ventilator aft of the after engine hatch, between frames Nos. 25 and 26, and discharges through a duct, from which branches lead to various parts of the after engine room.

The dynamo room is ventilated by two No. 4 "Monogram" electric fans, one working as a supply and one as an exhaust. The supply fan is placed on the after side of the electric storeroom bulkhead, and takes the air from a duct leading through the electric storeroom to the ventilator aft of the after engine hatch, between frames Nos. 25 and 26. The discharge from this fan is through a duct which has three branches, one to each dynamo.

The exhaust fan is located on the after side of the fixed-ammunition room bulkhead, and takes the air from the dynamo room and discharges it into a duct which leads through the fixed-ammunition room to the after engine room, thence to a ventilator leading to the deck.

These changes have partially relieved the excessive heat complained of, both in the engine room and dynamo room, while steaming in the tropics, although now it reaches a temperature of 120° F. with wind aft.

The *Philadelphia* sailed for the Hawaiian Islands July 26 and returned to San Francisco October 9. Sailed for Central American ports November 22, touching at Acapulco, Mexico; Corinto, Nicaragua; Punta Arenas, Costa Rica; Acajutla, Salvador, and San Jose, Guatemala; the end of the year finding her at the latter place.

While at the Hawaiian Islands in August I accompanied the United States Commission for framing laws for Hawaii, with officers of the board of health, to the leper settlement at Molokai. This place, situated on a peninsula on the northern side of the island, with its base a precipitous cliff 2,000 feet high, has been so thoroughly described by previous medical officers as to render any further notice unnecessary. At the time of my visit there were about 1,100 lepers, and I endeavored to ascertain whether the disease was increasing or diminishing. I found this a difficult point to settle. For ten years past the district physicians throughout the republic have reported the disease as diminishing. Meanwhile the number of lepers at the settlement has remained about the same, and the native population, to whom the disease seems confined, has diminished. Drs. Day and Wood, of the board of health, are of the opinion that the disease is gradually being eradicated. Dr. Alvarez, the bacteriologist of the board, is not of this belief, holding that the actual number of cases is on the increase. He, as well as the two first named, think that the tubercular, the more severe form of the complaint, is gradually giving way to the anæsthetic type. I can not avoid the impression that the disease among the Hawaiians themselves is not diminishing.

On the coast of Central America I accompanied the commander in chief to the capitals of Nicaragua, Costa Rica, and Guatemala. At the first-named place, Managua, I was unable to obtain any information beyond the well-known fact of the great prevalence of malarial fevers, pernicious frequently.

At San Jose de Costa Rica, through the kindness of Dr. Echeverria, I visited the general hospital. It is an institution of 200 beds for diseases of both sexes, and well equipped with an aseptic operating room. The population of Costa Rica numbers about 230,000 persons. The Government inspects prostitutes, every one being required to register and to be examined once a week. No house of prostitution can be situated within 200 yards of a schoolhouse. Vaccination is compulsory. People can be buried without a medical certificate. Formerly under religious marriage laws illegitimate births were exceedingly frequent. Under civil law marriage is cheaper and quicker, and illegitimacy is diminishing.

Gastro-intestinal diseases from improper food, bad cooking, and bad water are frequent, such as typhoid, dysentery, diarrhea, and anchylostomiasis or anæmia, caused by the anchylostoma duodenale, are here quite common.

There is a good deal of malarial and pernicious fever. Yellow fever occurs at Port Limon and at Punta Arenas. Tuberculosis has been gaining a foothold in the past twenty years. Chronic bronchial affections and asthma also occur. There are about 100 cases of leprosy in the country, of the anæsthetic type, for whom the Government is now erecting a hospital on the Isla de Cedro, an island in the Gulf of Fonseca, reserved for the purpose of segregation. The doctor affirms that diphtheria, although prevailing somewhat, is not contagious. There has been no smallpox for eighteen years. Scarlatina and measles are rare. He mentioned a disease peculiar to the country where so many of the inhabitants are habitually barefooted—a thickening of the skin on the bottom of the feet, and subsequently dropping off. Sometimes the whole plantar surface with adjacent muscles to the bones separate, requiring amputation.

The limit of life seems to be about sixty years; the greatest mortality is among children under five years, due to gastro-intestinal diseases mentioned above.

There is a great deal of alcoholism and insanity resulting therefrom, owing to the common drinking of crudely distilled cane liquor.

I was unable to visit a lunatic asylum of which the inhabitants seemed very proud. There is no medical college in Costa Rica, physicians being educated in the United States or Europe.

In Guatemala City, Guatemala, the commander in chief and his staff visited the general hospital, a large institution of 600 beds, for all diseases, medical and surgical, of males and females. At the time of our visit there were about 450 patients with mainly gastro-intestinal complaints, malarial fevers, some tuberculosis, and syphilitic cases. The institution was in excellent order and had an aseptic operating room. A large French cooking range in the kitchen of new pattern, recently placed, attracted general attention.

On another occasion we went through the wards of the military hospital, of 200 beds, with about 50 patients. It, too, seemed to be in good order. There is a medical college in Guatemala City.

No deaths have occurred on this ship. Fifteen patients have been transferred to the naval hospital at Mare Island, Cal., six being cases of measles which occurred shortly after the ship was commissioned. The sick have averaged a little over five daily. The complement of officers and men is about 395.

REPORT ON THE U. S. S. BALTIMORE.

By John C. Wise, *Medical Inspector, United States Navy.*

The ship was at Honolulu from January 1 to March 25; then crossed the Pacific to Hongkong, joining the Asiatic Squadron, which entered Manila Bay May 1, and remained in the Philippines at the end of the year.

During the entire year the health has been good.

The only conditions which require special notice, as etiologic factors in the annual sick report, are venereal diseases and fevers.

The percentage of venereal diseases was much greater on the Asiatic Station than on the Pacific, and this is true despite the fact that while in Honolulu the crew had regular liberty. At Manila they had none between May 1 and August 13, and then of a limited nature. Most of the venereal cases came from Hongkong. The British possessions in Asia are so beset with the malady that it has attracted the attention of the home government, the philanthropist, and moralist. Asia is doubtless the home of venereal diseases, and it has in the ages past permeated the native population. One week's stay at Hongkong is responsible for nearly all diseases of this class.

In the new tropical possessions of the United States there is an excellent field for the study of fevers, which gave one hundred and thirty-five days of illness on this ship. From a clinical and bacteriological study of the cases occurring on the *Baltimore* and noted on shore general conclusions were reached, which are as follows:

First. There is no reliable nomenclature for tropical fevers, the terms jungle, Walchéren, Syrian, etc., having no significance except as to locality.

Second. While paludism causes a great number of cases, far more are due to other causes than is generally supposed, such as direct exposure to the sun, prolonged wetting of the body, undue use of alcohol, and of food adapted to temperate climates and not to the tropics.

Third. It is believed in those cases where diarrhœa is so persistent that the fever is often secondary and septic, not essential.

Fourth. Periodicity is much rarer in the tropics than elsewhere, continued pyrexia being the rule. Quinine is of no value in many cases showing malarial symptoms. The inability to detect the plasmodium in the blood of a large percentage of cases is noticeable.

It was recommended in the last annual report that the means for personal identification in the naval service be systematized.

Two cases of mental disease have been condemned in this ship. Case No. 1, a seaman, made a threatening attempt on the officer of the deck while on watch, and after confinement went into the "status epilepticus." The immediate cause of the trouble was loss of sleep, as the men stayed at the guns for a lengthened period. This man had previously been in the Mare Island hospital for mental disease, but he had no difficulty in enlisting after discharge. Case No. 2, a seaman, was one of melancholia. In changed environment, with good care, he has entirely recovered; but it seems no man who has suffered any form of alienation should remain in the Navy. This man would readily be accepted for service.

When proper occasion presents, the ventilation of the dynamo room and galley require attention. There are no bathrooms for wardroom officers; it is suggested that a shower is the most useful and economical on shipboard. The sick bay has no water supply.

I can not refrain from calling attention to a present want in the service, which is a better method of cooking food for the ship's company; the ration is excellent. Outfits of lighter underclothing for the crews of ships in the tropics is a matter of great importance and should receive consideration. The men of this ship have suffered from prickly heat (lichen tropicus) to a great extent, while intertrigo about the thighs and testes has led to invaliding.

The prolonged stay of this ship in a tropical climate, with the low sick rate, exemplifies how much can be done to maintain good health under adverse conditions. Other things being equal, the modern ship is far more healthy than the older wooden ship.

The sick have been made very comfortable, and owing to the foresight in the provision of supplies it has been practicable to keep on liquid diet those cases demanding it. The lack of fresh milk is, however, much felt here.

PREPARATION OF MEDICAL DEPARTMENT FOR BATTLE.

Every precaution was taken to make arrangements as complete as possible for immediate aid to the injured. Had the enemy's gunnery been in any way equal in effectiveness to our own, it is very certain all the injured could not have been cared for by two medical officers.

The crew generally were fairly acquainted with first aid, and dressings were placed in bags and hung at accessible points. Stretchers were placed along the decks, and aids to wounded were well instructed in their use. But one station for operation was established, which was forward on the berth deck. This was in charge of the assistant surgeon. The senior medical officer was on the spar deck to superintend transportation and give aid to emergent cases. The wounded were sent below on a specially devised stretcher and slide, which answered the purpose well. A large quantity of dressing material was made of cotton purchased in Yokohama, and prepared for use in a sterilizer, improvised from a mess kettle.

A quantity of medicines and stores of the enemy fell into our hands at Cavite. We found the iodoform (not of good quality), quinine, slippers, crutches, and towels of service. If we can judge from the enemy's stores captured, we must infer that they do not use in the medical service (naval) the improvised tourniquet, known as the "Spanish windlass," but a very convenient instrument, consisting of a cord 29 inches long, one-fourth inch diameter, having a toggle 5 inches long at one end and a loop at the other; the body of the cord is made of cotton, and is carefully covered with the same material closely woven around it, giving a certain amount of elasticity.

It is not considered in the province of this report to enter into a discussion of the operations on shore. The condition of the Spanish wounded in insurgent hands was deplorable; they were housed in basements, there was no cleanliness or comfort, and most if not all the surgery was done by the medical officers of the fleet. There was no inhumanity involved, for all was done for the Spanish wounded which the limited facilities of the rebels permitted.

REPORT ON THE U. S. S. NEW YORK.

By C. U. Gravatt, *Medical Inspector, United States Navy.*

At the beginning of the year the *New York* was at Hampton Roads, Virginia, and at Key West or Tortugas, Fla., from January 24 until April 22. From that date until July 19 she was actively engaged around Cuba and Porto Rico. Was at Guantanamo, Cuba, from July 19 to August 15; New York from August 20 to November 9; Hampton Roads from November 10 to December 3; Havana from December 7 to 16, and at Tompkinsville, Staten Island, the rest of the year. One hundred and thirty-three days were spent at sea, though properly to this number should be added the sixty-six days at Key West, the ship being anchored near Sand Key Light, 7 miles from port and practically under sea conditions.

During the period of hostilities with Spain the complement was 659 and the average for the year 597. The daily average of patients was 12.42, the total sick days 4,537, and the daily percentage of sick 2.06. There were 497 primary admissions to the sick list and 31 readmissions. Of the former 123 belonged to the general infectious disease class, viz, catarrhus epidemicus, 84; malarial disease, 26; febris enterica, 3; rheumatism, 5; vaccina, 3, and dysenteria acuta, 1. The nervous disease class furnished 40 cases, none serious. Eighty-six belonged to diseases of the digestive apparatus—e. g., 37, catarrhus intestinalis, due to ptomain poisoning and already reported; 2, appendicitis (one of which was transferred to hospital, the other recovered on board without operation); 26, tonsillitis. One of the last was of special interest in the display of its close connection with rheumatism. The man was admitted on December 28 with the usual symptoms of tonsillar inflammation. By January 1 the throat had quite recovered. Grave meningeal symptons then arose and continued for forty-eight hours. Both wrists became involved at that time and the brain disturbance subsided. He was transferred with rheumatism art. ac. The genito-urinary class was represented by 55 cases and "injuries" by 84, comprising 11 fractures, 26 contused, incised, and lacerated wounds, and 6 gunshot wounds.

Four deaths occurred from the following causes: Nephritis ac., 1; railway accident, 1; vulnus sclopeticam, 1; asphyxia ex submersione, 1.

Of the 41 cases transferred to hospital, 6 came from other vessels.

During the one hundred and fourteen days of warfare the ship's complement was unusually large; a number of cases were brought on board for treatment from small vessels having no medical officers, thereby swelling the sick list, and on the August 14 there were 8 cases from other vessels. The sick list was higher on that particular day than on any other day of the year, owing to an epidemic of intestinal catarrh. Three days later it was 21, and, deducting the 8 extra cases, 13, or just about the average for the year.

The greatest discomfort of the blockade duty around Cuba was from the heat of the berth deck, the temperature ranging from 98° to 110°. The sources of this heat were the engine-room trunks, evaporating room, and dynamo room. When at the New York Navy-Yard in October, the H. B. Johns Company, of New York, sheathed the after engine-room trunk (in the junior officers' quarters) with rolled asbestus as an experiment, and it was found so satisfactory in preventing radiation during a subsequent trip to Havana that it is earnestly recommended to similarly incase the remaining surface. The hot air from the dynamo room, which is now poured into the principal berth-deck compartment, might be diverted by a shaft to the spar deck. As to the evaporating room, it should be removed from the berth deck altogether, if possible; if not, its walls should be sheathed with asbestus.

In a special report to the Department attention was called to the inadequacy of sick quarters, and three suggestions were offered in the order of their desirability, viz: (1) to allot a sufficient space on the gun deck for all purposes; (2) to utilize one side of compartment A 129, if the torpedo tubes should be removed from the ship; (3) to enlarge the present sick bay. The first of these met the approval of the commanding officer, who has seen and appreciated the disadvantage under which it is necessary to care for sick and wounded. The suggestions are now again urged.

I specially recommend that in the construction or overhauling of steel ships provisions be made to have stateroom bunks inboard instead of outboard, where their occupants are subjected to severe drafts in cold weather, which are not only most uncomfortable but may cause serious illness. On some ships, like the *Helena*, an effort has been made to correct this by running a steam pipe between the bunk and the ship's side, but hot drafts are also objectionable, and steam pipes are liable to leak or break when most needed.

REPORT ON THE U. S. S. BROOKLYN.

By PAUL FITZSIMONS, *Medical Inspector, United States Navy.*

On the 19th of May the squadron left Key West for the southern coast of Cuba.

When war was declared the stations of the medical officers were changed, as it was considered impossible during battle to remove the wounded to one or two compartments and unwise to expose 75 or 100 men to the risk of being killed by a single shell in an unprotected part of the ship.

The senior medical officer was stationed on the gun deck aft, the junior medical officer forward, and the hospital steward on the berth deck. Each carried a haversack with first-aid materials and was accompanied by a hospital apprentice, carrying a knapsack with additional supplies.

A sterilizer of galvanized iron large enough to contain a Macomb strainer was put up in the after sick bay, and steam connection made with the ship's boilers. A quantity of gauze was sterilized and 150 first-aid packets made. These were distributed in packages in permanent places, accessible to such gun crews as might not be able to obtain first aid quickly from a medical officer. The crew was frequently instructed in first aid, and also where to put the wounded. The experience gained in three engagements with the shore batteries at Santiago was misleading, as the empty copper cases were piled up near the guns, and these took up much room, in addition to that given to the extra supply of fixed ammunition. During the battle of July 3 the empty cases were thrown overboard, and left the lee side of the decks clear.

A stretcher devised by Lieutenant Mahan and seen at an inspection of the *Machias* the previous fall was made on board, and serves admirably in moving injured men in contracted spaces. The man is strapped to a board by three broad bands, the middle band, which is the most important, crossing the thighs and fixing the femurs firmly against a raised piece nailed across the stretcher. A becket at either end furnishes attachment for the lowering and guiding lines. A man can be raised or lowered through any space that will admit of his body passing. A patient was taken from the bottom of a collier alongside and slid over a plank laid from the deck of one ship to the other. Another patient, in jumping down into the midship magazine, slipped and cut up the shoulder muscles against the sharp points of the ammunition boxes. He was put face to the stretcher and held on by his hands, while supported firmly below by the two lower bands.

The fleet blockaded Santiago for five weeks, lying off the entrance about 2 miles in the open sea. Fortunately the trade winds were usually fresh, and no one suffered from the heat on the main and gun decks. The berth deck was like an oven. It was heated on the outside by the sun and inside by three smokestacks. The battle ports were closed, and a moderate amount of air was driven by the blowers. The warrant officers' rooms were uninhabitable. The awnings could not be spread, and after a time the men were permitted to sleep in the open instead of sweltering below. They would lie on the forecastle wrapped in blankets, and no case of sickness was caused by it. The crew also worked in the sun coaling ship frequently without injury.

Although it was the height of the rainy season, and while we could see deluges on shore, we were free from rain most of the time, but special care was taken to make the men change into dry clothes as soon as possible. What sickness we had off Cuba was comparatively trivial. Four men were invalided; one with gunshot wounds sent to the *Solace*, and two with injuries to the ear caused by blasts from heavy guns, sent to the naval hospital at New York, were incidental to the war, and the fourth was invalided with remittent fever. In the fourth quarter, all of which was spent off New York, nine men were invalided from serious effects of the climate.

There was, and has been since, no traces of the nervous strain of war, about which so much has been written. It is true that the enemy's torpedo boats were inactive, and no one lost rest, except from two or three false alarms. The men worked hard, and every now and then lived hard, but there seemed just enough excitement about the occasional bombardments to keep them from stagnating. In the battle of July 3 the casualties were so few, and the destruction of the enemy so complete, that there was no room for depression.

REPORT ON THE U. S. S. MONTEREY.

By Franklin Rogers, *Surgeon, United States Navy.*

There were 30 admissions for venereal diseases during 1898, and these were four hundred and twelve days on the sick list, being within a fraction of one-third of the total number of sick days.

Besides the above, 22 cases of chancroid, and 5 of gonorrhea, were treated, not on sick list. The whole number of venereal cases presenting for treatment, as the result of "liberty" in Manila, from about the 20th of September to the end of the year, was 50, just one-fourth of the "average complement" of the ship for the last quarter, a forcible indication of the condition of the public morals of this locality.

The debilitated condition of the crew, due to the long and trying voyage from San Francisco to Manila, and subsequent exposure to the enervating climate of this bay, rendered them peculiarly susceptible to the chancroidal virus and its effects. Adenitis inguinalis developed in a number of these cases, and speedily progressed to suppuration, destroying skin and surrounding tissue in spite of efforts to prevent this result. Two cases of syphilis, contracted in Manila, presented classical features, but proved very amenable to treatment.

Dengue developed among the officers and crew during the last quarter, and to a greater proportion among the officers than crew. Of the 17 officers on board, 8 had this peculiar affection—6 of these to a degree necessitating admission to the sick list. There were 13 admissions with dengue, and these were one hundred and sixteen days under treatment—an average of eight and twelve-thirteenths days to each case. Quite a number of cases occurring among the officers on duty at the naval arsenal in Cavite, and on the *Callao* and *Manila*, lying near shore, came under my observation and care, but are not accounted for in this report. These, with the cases occurring on board this vessel, all had symptoms of a similar nature, and ran a similar course.

A short account of this disease, as it is encountered here, may not be amiss in this report. The Philippine variety of dengue is an acute infectious disease, characterized by fever, with accompanying skin eruptions. The eruption is usually confined to the trunk and limbs, and is macular, as in roseola, or papular, as in measles, rötheln, or lichen tropicus.

The face is usually congested, varying in degree, and desquamation usually follows. The conjunctiva is always injected, and this feature is often the only sign, aside from the headache and varying fever, to denote the nature of the illness. The tongue is covered with a moist white coating, the tip and edges remaining clean (yellow-fever tongue). The bowels are constipated, as a rule. Headache, present in all cases, is often the first indication of the onset of the disease. Pains, often severe in the lower part of the back and calves of the legs, were present in every case, and often were the only feature complained of. Muscular weakness and mental prostration were also frequently noted. Somnolence, in some cases amounting to stupor, was a marked characteristic in these cases. Enlargement of the lymphatic glands, cervical and inguinal, was noted in 4 of the 13 cases occurring on board.

The onset of the disease was without any premonitory chill or other indication, excluding headache, as the thermometer always indicated fever present when this symptom was complained of, and usually occurred in the afternoon or evening.

The fever is a "three-day fever," remittent in type, and relapses are the rule. It is very variable in degree. The highest temperature observed in a severe case was 104.4°, and in a mild case 99.4°.

The first remission is accompanied by profuse perspiration, and it is at this stage when the eruption on trunk and limbs makes its appearance. With the fall to or near the normal temperature the eruption may be increased or its character changed, as from a roseola to an aggravated form of lichen, or to a rash simulating measles or rötheln. The pulse rate does not keep pace with the increase in temperature. In one case the rate was 45 per minute for some days. No painful or swollen joints presented, differing in this respect from the Panama variety of dengue I encountered years ago. Complete recovery was the rule in all cases noted.

As to origin little is known. The disease is endemic on these islands. Its appearance on this vessel is accounted for by the first patient and of the officers employed at the arsenal in Cavite contracting it from native workmen with whom they came in contact. There is no doubt in my mind of its infectious nature.

The disease being self-limited, treatment is symptomatic. Antipyrine reduced the fever and relieved the pains. Quinine was of little if any value in these cases. The length of time cases were under treatment varied from two to twenty-four days.

Measles, 1 case, occurred on board April 2, and rubella, 6 cases, in May and June. The cases occurring on the 14th, 15th, 19th, and 24th of May, presented while the ship lay off San Francisco, where the disease was epidemic at the time. The two cases presenting on the 14th and 15th of June occurred while the ship was at sea, seven days out from San Francisco. By isolation of the patients, and disinfection of person and clothing, the disease was readily controlled.

The *Monterey* was stationed along the coast of California up to June 7, on which date she sailed for Manila, via San Diego, Honolulu, and Guam, arriving at her destination on August 4 with everyone on board at his "station." Not a bad showing, considering the long sea trip and the conditions under which it was made. Since August 4 the ship has been stationed in Manila Bay, the major portion of the time off Cavite.

The sanitary condition of the ship, so far as I can testify, has been as satisfactory as the existing conditions and limitations permit. Ships of this type are not suitable for extended cruising or service in the tropics. At best they are hot and humid habitations, and this one is no exception to the rule. The health of officers and crew must deteriorate in consequence, and their efficiency be impaired in proportion.

The chief cause of complaint is the excessive heat and moisture below, particularly at sea, and improvement in this direction is urgently called for.

The ventilating system is defective and inadequate to the demands. A double-acting supply and exhaust system with additional fans should be installed.

It is a question in mathematics to determine the capacity of apparatus necessary to furnish the required amount of fresh air to all parts and persons on board ship. Under existing circumstances those of the crew that sleep below do so because they can not find space above.

The ship's company has been unusually exempt from phlegmons, ulcers, and other skin affections. I attribute this to the liberal allowance of fresh water, and strict attention to the cleanliness of persons and clothing of the men on the part of the commanding officer.

REPORT ON THE U. S. S. IOWA.

By M. H. Simons, *Surgeon, United States Navy.*

The internal arrangements of the *Iowa* that have an adverse bearing on health have not been materially changed in spite of the recommendations made. Our own force has led a pipe from the tanks to the scuttle butt, which has very much lessened the temperature of the water at delivery.

There is room for electric extractors and ventilators in the torpedo rooms, ammunition passage, forward storerooms, and hold; their expense would not be great, and the increase in comfort and health of the occupants would be very large. There is also a space in each engine room, behind the cylinders, where the hot air lies until the heat is from 20 to 40° greater than in any other part; this place can be ventilated and the whole engine room space thereby rendered cooler. The forward fire rooms can be made vastly cooler by connecting them with the forward 12-inch handling room at trifling expense. The ventilation of the distiller room is entirely inadequate and the temperature is so high (145°), frequently, that the man neglects his watch on the gauge to stand under the small cool-air inlet. The exit shafts for hot air in the dynamo room are so small that half the hot air collects in one or the other ammunition passage, increasing greatly the discomforts of those who must work there, especially in battle. The temperature of the dynamo room varies from 107 to 125°.

The present system of steam fans is run to force air in, for, were it to extract, the hot air would rush in from the engine room (the citadel berth deck is filled with this hot air) and make the rooms unbearably hot, but, if electric fans, arranged as extractors with large outlets, were to be put in the places mentioned, the cold air would come into the citadel, engine rooms, ammunition passage, storerooms, etc., down the hatches toward the engine rooms and other places mentioned, and thus make all places more comfortable, directly and indirectly. As there are not comfortable quarters for an admiral and staff, the present admiral's quarters ought to be so arranged as to give better quarters for the commanding officer and rooms for those who now live in the citadel. The latter is not a proper place for officers' quarters, but can be made fairly comfortable for machinists and those who are accustomed to heat by means of the ventilation above proposed.

The ice machine is one-half proper size; it will not keep the refrigerator rooms below 45° in warm weather (except in the first room), and it will not keep the water in the scuttle butt below the point of nauseating lukewarmness. This is not saying anything against the machine, which rarely has been stopped during any length of time for repairs. There is only one scuttle butt for this large crew, and it is filled from eight to twelve times in the day, and therefore the water has not time to be cooled to the point of gratefulness to the palate of an overheated man. In cold weather and latitudes there is no complaints. But we are generally in the hot latitudes. The distiller has a theoretical capacity of 7,500 gallons, but the condenser pipe is so short that it can only be run at a little over half force, or salt water will be forced over in such quantity as to make the water unpotable (theoretical capacity of the distiller, 7,500 gallons; practical, 4,000 to 4,500); consequently the water has to be allowanced. The quality of the bread and the comfort of the bakers can be improved by running a partition around the smokestack where it goes through the bakery, and putting in an electric fan and ventilator. The staterooms for officers in the citadel, at sea, in warm weather, have a temperature range of from 93° to 100°; artificial light has to be used all the time. If the admiral's quarters be abolished, most of these can be given up to other purposes, or changed and ventilated for quarters for chief petty officers. They ought to be properly ventilated, no matter who occupies them. The heat of the deck can be warded off a little by a rug of canvas and magnesia paper. The ventilation of the machine shop ought to be increased and a light floor put in. The protective deck lies over the boilers and becomes so hot that one can not well stand on it.

At the New York yard two electric fans were provided, which have added immeasurably to the comfort of the sick. A fan and ventilator ought to be placed in the sick bay in the hatch leading to the magazine. The temperature in the captain's cabin and staterooms of officers outside of the citadel varies, in warm weather, from 80° to 90°; a quite constant temperature in warm weather, at sea, is 83°; in hot weather, at sea, it varies from 88° to 90°.

The attention of the Bureau is earnestly called to the subject of the physique of recruits for the engineer's force. Some examiners apparently think that it is sufficient for a recruit to have a sound physique, but a man may have muscle enough to lift 110 pounds (weight of bucket of coal) of coal easily, and fail utterly when he is obliged to do this frequently for four hours consecutively, in a very hot atmosphere. A recruit should be strongly built, have not less than 36 inches chest measure (at rest); and weak inguinal rings and the slightest varicocele should be positive bars to enlistment. During the war a number of inferior men were sent to this ship. An engineer apprentice system should be organized. Green men are often useless from fright; the vast machinery, the great heat, and the stifling air of the coal bunkers put them into a semihysterical condition which makes them utterly useless and possibly dangerous. Several such cases came under observation during the past year. When a fighting machine goes into action every man and part should be in condition to do the best possible work. No complaints were made of the work or material of the medical department of this ship during the past year. The supplies were amply sufficient.

During the trip to San Juan, and on one or two other occasions when the heat was great, the men in the engine and fire rooms drank so much warm water that nausea and vomiting often occurred, and nothing could be retained. We found that under these circumstances the trouble could be checked and even avoided by a moderate dose of alcoholic stimulant (part of the time we used alcohol itself), with capsicum, gentian, or hydrastis. This dose seemed to put the stomach in proper tone for the digestion of food, and to lessen the thirst. As a preventive it was given when the men came off watch. Heat prostration was treated by putting the man in a bunk with a wet towel over his face and head and giving 0.6 grams of acetanilid; in one hour, if the temperature still stood above 100°, 0.3 grams were given or until the temperature stood below 100°, and then a bath was given, in which the patient lay for fifteen minutes; the water was at first warm and then gradually cooled to the temperature of the sea water in the pipes, probably about 76°. The acetanilid equalized the circulation and subdued the nervous symptoms; the lukewarm bath seemed to aid this and to exert a specially and noticeably good effect on the digestive tract.

In the handling of the frozen meat from the supply ship great care was exercised, and to this I attribute the freedom from diarrhœa to any marked extent of the crew of this ship at Guantanamo Bay. By my request, ice and meat were brought together in the boats and both were packed in the refrigerating rooms with as little exposure as possible; the meat was served out as needed, cut up, and cooked as soon as possible. Instruction was given that the proper way to thaw frozen meat (beef, mutton, and poultry) is to put in cool water for one or two hours; it will then thaw slowly and absorb enough moisture to be juicy. Exposed in the open air or placed in hot water (or warm) it soon becomes tainted and unfit for use. The cases of diarrhœa on this ship seemed to be directly due to over eating and drinking. The commissary or single mess system works well, except that the tendency is to buy and use too much coffee; the faulty method of making the infusion prevents the deleterious effects to some extent, but three or more bowls of coffee a day are too much, and inevitably lead to digestive troubles.

The apparatus used for lowering the wounded was, I believe, peculiar to this ship. A piece of canvas was fastened to the hand rail of the forward torpedo-room ladder (which was left shipped) by means of hooks fastened to lines which were rigged through eyelet holes in the sides of the canvas. By this means a canvas trough or slide was made over the whole length of the ladder. A horizontal piece was fastened to two bars and rested on the ladder at one end and a wooden horse at the other; this was about the length of the average man, and acted as a receiver. Belts of canvas, about 6 inches wide and 2 feet long, with an eyelet hole in each end and a ring of rope passed through these holes and spliced, were supplied to the tops, bridges, turrets, and upper decks. The belt was passed under the arms, and the ring of rope, which was also about 2 feet long, was hooked onto a fall by one side; the weight of the man drew the belt tight and he was safely lowered onto a stretcher or the slide. Fortunately the services of this apparatus were not often needed, but it worked well, better than the pole, and required only one man to lower the wounded. Tourniquets were made with pieces of bandage and a wooden peg. The chaplain and the pay clerk were detailed as assistants, and were put in charge of the stretcher on the main deck.

About 1 p. m. July 3 the Spanish wounded were brought aboard from the *Vizcaya* and other vessels; there were 37 wounded, not including 3 officers with slight wounds and contusions. Three officers and forty-odd men were treated for colic, diarrhœa, dysentery, and malarial fever; and many were given stimulants for the extreme exhaustion following the battle and subsequent struggle to reach the shore; 278 officers and men (29 officers and 249 men) were received; to these were issued about 180 suits of white working clothes, and many socks, shoes, and hats. Thirty-four cases of wounds, 12 of malarial fever, and 7 of dysentery were transferred to the *Solace*. The medical division worked faithfully with very little rest until about 1 p. m. of the 4th, when the last of the sick and wounded left for the *Solace*.

When the first Spanish wounded were brought into the sick bay they resisted violently, evidently fearing that they would be tortured; but when they found that their wounds were carefully dressed, drugs given to soothe their pain, and clean clothes and mattresses or hammocks given them to rest on, they would cry, and pat our hands, and say "good Americans," over and over again. It appears that they again became frightened when taken to the *Solace*, and that they tore off their bandages, injuring and doubtless reinfecting the wounds. Every precaution was taken on this ship to render the wounds aseptic, though they were generally ragged, filled with dirt, splinters of wood and steel, and pieces of cloth. The shell wounds were all charred superficially. There were many burns, generally small, as from contact with hot wire rigging or small pieces of hot metal. There were five wounds from 6 mm. bullets, from two of which I removed the bullets (the wounded begged for these and were given them as mementos).

The bullets were of full size but distorted, as if they had passed through some metal plate before striking. One was firmly planted in the mastoid portion behind the left ear, base projecting. Another had its point embedded in the right femur, just below the trochanter. As this vessel was the only one using a machine-gun (the marine in charge of it insisted upon being permitted to go into the top to try it), these wounds prove that the *Iowa* was that day within its working range—2,000 yards. An ensign whose left arm was amputated begged that his friend, a Spanish assistant surgeon, be allowed to dress it. This, of course, was permitted. The doctor insisted upon stitching the flaps with silk taken from a card carried in his pocket; the thread was very heavy and twisted, and therefore hard to disinfect, but we attempted it, and had the wound thoroughly washed and cleansed and packed with boric-acid gauze, etc., and drained. I understand that it afterwards became infected. We transferred 34 wounded and 19 sick with fever (malarial) and dysentery, as our orders were to transfer all sick and wounded. We also transferred a practicante who had a slight wound of the finger, thinking that his acquaintance with the men and with the vernacular might be of benefit to the surgical staff of the *Solace* in case of trouble with the men, or where a man was stupid or ignorant. Admiral Cervera, Captain Eulate, many other officers, and many of the sick and wounded, personally thanked us for our care and attention.

Our own men on the sick list filled their stations during the engagement, and as a rule kept away from the sick bay until after the Spanish sick and wounded had left. Our endeavor to inform the *Solace* of the name, rate, wounds, or disease of the patient by pinning a slip of paper on the person of the patient was defeated by the failure of the practicante, to whom I intrusted this, to put the wound or disease in. This was only discovered when it came to making up the report from the duplicate slips left. This was partially remedied by questioning the men on the *Solace* when we next met her. So busy were we and so hurried that this could not be done when the wounds were first dressed. Many of the wounds were so severe and the hemorrhage so extensive that no time could be safely spared for any other duty.

Saturday evening, July 2, signal was made from the flagship for a medical officer from the *Iowa* to go to Siboney to assist the army surgeons. (Dr. Crandall and myself had previously placed ourselves at the disposal of the fleet surgeon for any such duty.) Taking with me Apothecary McLean, Drs. Spear and Elliott joined me from the flagship. We reached the hospital about 8 p. m. and found Drs. La Garde and Nancrede on duty, but nearly exhausted after forty-eight hours' work without proper rest. We persuaded them to leave the duty to us and to take a fair night's rest. This they thankfully did, though the latter stayed with us until nearly midnight to show us where all needed articles could be found. The hospital was made by placing several tents with backs and fronts joining and left open, except the front of the first and back of the last. Three or four tables, somewhat similar to the navy table, but heavier, were placed longitudinally to one side of the center; on the opposite side were the dressing tables. Spare articles and sheets were under the flaps. There was a sufficiency of articles needed. I even found a pair of blue goggles for a rough rider suffering from photophobia after measles. The number of attendants was inadequate and the food was poor. The cooking and drinking utensils were limited, as was the table furniture. The water was drawn from a one or one-half inch stand-pipe, and was, I understand, from a reservoir in the hills. There were (estimated by Dr. La Garde or Nancrede) about 450 wounded. There were some cots, but the majority lay on a rubber or woolen blanket spread on the ground. All were cheerful except a few in one tent, and there the flap had slipped down, making it very hot, and they were in need of water.

I was struck by the slight laceration made by the Mauser bullet and by the ease with which it had been deflected. I saw one negro regular who had been struck in the forehead about 2 inches above the right eye. The bullet traveled around under the scalp, emerging near the occipital protuberance. An officer—regular—a very stout man, was struck in the left hip. The ball was deflected upward and to the right across the abdomen, then down, to be embedded deeply among the muscles on the inside of the right thigh. The genitals were of an intense coppery hue, and this seemed to give the patient more trouble than the wound. There were several cases of penetration of the chest cavity, and in these the ball had generally struck the rib, been deflected into an intercostal space, and had generally come out behind, near the lower edge of the scapula. There was astonishingly little distress, even in the abdominal wounds. I think that the wounds were generally caused by dropping bullets, for the actions were at long range, and the velocity of the Mauser bullet is about 2,250 practically. The velocity of the navy rifle (Lee straight-pull, not Lee-Medford) ball is 2,560 to 2,640 with the 112-gram bullet, and the effects on the Spanish at Guantanamo and on targets, as shown by Karmany and Twining, are quite similar to those of an explosive bullet, but are due to the velocity and in direct proportion to it. I am sorry that I was unable to keep notes. Nothing but the most necessary operations were attempted, for the light, though excellent of the kind—oil lanterns—was insufficient.

The first-aid dressings did their work well, and few wounds were infected, though some men had been two or three days hobbling in from the front. The wagons had been assigned to Dr. La Garde for the transportation of wounded and to the Red Cross for the carrying of stores to the reconcentrados and fugitives from Santiago, but neither one had been able to get them so far. There were no ambulances; they were yet on the transports and the parts could not be assembled.

The next morning there was a lull in the arrival of wounded, about 8 o'clock; Dr. Lesser and three (I think) female Red Cross nurses then arrived, and Drs. Lewis, U. S. S. *Harvard*, and La Garde and Nancrede. The Red Cross people did not stay at night. I then left on the Herald yacht *Golden Rod* for my ship, having promised to return. We met the flagship bringing Admiral Sampson to Siboney, and as we passed Aguadores, and were about 3 miles from the Morro, we saw our squadron head toward it and open fire, and soon after made out the Spanish ships coming out. After clearing the harbor about half a mile they headed west. They were followed at a distance of a mile or mile and a half by the two destroyers, in close order. The Spanish ships and batteries fired rapidly. The ships on both sides looked like rolling clouds of smoke, through which the flames from the guns flashed incessantly, and little could be seen of the form, only the masts projecting above, and the flags, lighted up by the burning particles in the smoke, shone over all. The *Resolute* passed outside of us, going toward Siboney. I thought our ships would be perfect shambles, and was frantic at the idea of being away. I urged that the yacht be run alongside the *Iowa* at all hazard to let me spring aboard, but the captain thought that we should be struck and sunk, though I pointed out to him that the Spanish shot were passing overhead and churning the ocean to a foam some 5 miles or so out, much to the dismay of some colliers or transports out there, and that the closer we were in the less the danger, except from some accidental shot. He was not reassured, but kept on in the wake of the flying ships, slowly gaining, until we came near the *Maria Teresa*, which was ashore and burning; and there the *Hist* came up and kindly stopped to let me get aboard, and I reached the *Iowa* just as her boats were nearing the *Vizcaya* to rescue the crew. Great was my joy to find no familiar face missing among those gathered aft. Soon after the wounded Spanish came aboard, and the medical division for the next thirty hours was too busy to take much note of outside matters.

There has been one death from appendicitis on this ship—a fireman who indulged in two cans of peaches at one meal. This set up an inflammation which extended to the appendix. We were then on blockade off Havana, and rumors of action at any time were common. During quarters for action the sick must be transported from the sick bay into the citadel, where the chief petty officer's quarters are made into an operating room. We did not feel justified in operating with the quite certain prospect of frequent moving of the patient, so he was started for the army hospital at Key West on the tug *Algonquin.* The tug chased a sail or two, ran aground, and was badly tossed in a storm, so that a trip usually done in ten hours or less lasted about twenty-four. Though the acute symptoms had been subdued by the saline treatment before the patient left the *Iowa*, the exposure relighted the inflammation and the patient died the next day after reaching the hospital.

Thirty-nine patients were transferred to the *Solace*, or to the hospital at Key West, Norfolk, and New York, of whom one died, so far as is known. The report for last quarter of the year is unusually large from eight cases of chancroidal adenitis, and of syphilitic adenitis contracted in New York and concealed until we had gone to sea. The inflammation had then gone so far that it could not be speedily subdued.

The squadron for the Pacific left New York October 12; after a pleasant trip, except for three or four stormy days, it reached Bahia, Brazil, October 31; Rio de Janeiro, November 11; Montevideo, Uruguay, November 23; Punta Arenas, Chile, December 7; Valparaiso, Chile, December 17; Callao, Peru, December 26, and left the latter place for San Francisco, Cal., January 11, 1899. During that time there was no serious illness or injury on the *Iowa.* A case of typhoid fever appeared on the *Celtic;* it had, apparently, been a "walking case" for some time, and had been contracted in New York. For fear of possible infection of others, or of the provisions for the fleet, the patient was transferred, by recommendation of a board of survey, to a public hospital in Montevideo.

Nothing new was found in Bahia, Rio, or Montevideo, from a medical standpoint. The places were in the usual state; 33 cases of yellow fever and 4 deaths were reported in Rio the day before we left. The general opinion among the physicians seen was that the Sanarelli bacillus is not the yellow fever germ.

We visited the beri-beri hospital at Capocababas, Rio, and found most of the patients showing the disease in a light form. The physicians in charge claimed that it occurred only at Para and Pernambuco in Brazil. There is nothing special to note about the hospital or the treatment, which is symptomatic, except that the hospital has been placed on a height of 300 to 500 feet above sea level. The disease does not occur above a height of 500 feet, but twice or thrice that height is better, according to Japanese and Dutch (Formosa) experience. Convalescents among the naval men are kept on the south coast of Brazil thereafter, to avoid exposure to a second attack. Montevideo is the cleanest and most prosperous city visited by us; the streets are swept every night. The mixture of Spanish, Basque, North Italians, Germans, etc., has produced a race larger in figure than either parent stock. There is practically no negro blood in the population, and the half-breed Indian is a well-built fellow and a determined fighter. We left on the day on which I was invited to visit the hospitals and witness an operation by their most noted surgeon.

Tuberculosis, the scourge of Brazil, Chile, and Peru, is not so common here.

Punta Arenas is a growing town of 5,000 people, on a sandy slope, heavily timbered in the background with fir, beech, etc. Cases of chronic venereal diseases are said to recover very quickly here. Rheumatism and tuberculosis are the most common diseases.

Valparaiso and Santiago present nothing new, medically, worthy of note. The new hospital in Lima, Dos de Mayo, is of one story; the wards radiate from two patios like the spokes of a wheel from the hub. The large wards hold 54 beds; the small, 6 or 8; the contagious disease wards are in the same building, separated from the others by solid walls and locked iron doors. There are a steam sterilizing plant, a hand laundry, a large kitchen fitted with charcoal ranges, etc. The tuberculosis patients are not put in wards by themselves. There were many cases of verrugas, in all stages, chronic and acute; in some the eruption only appears in the digestive tract, and is nearly always shown by a post-mortem; in others it can be felt under the skin like No. 2 shot; in others the eruption comes in crops of bloody vesicles, but avoids the axillæ and flexures of the elbows and knees. One attack does not protect; race, nor age, nor sex proves any exception.

The Peruvians and Brazilians seem to be smaller in size than the Uraguayans and Chilians; the two former have much negro blood in them, and there is some Chinese also in the lower class, Peruvian often. Two very brilliant Peruvians have a large admixture of negro blood. The native Peruvian seen around Callao bears no resemblance to the Chinaman, and the aboriginal races sent to Chicago had the Chinese characters put on them by an enthusiastic supporter of the Chinese origin of the Peruvian Indian.

The university of medicine in Lima requires a course of seven years. The laboratories for chemistry, toxicology, bacteriology, etc., are well fitted with necessary instruments and appliances. Meteorology is embraced in the course. The botanic garden is under the president of the school. Not enough attention, in my opinion, is paid to the native medical productions. The necessary cost per year for fees and chemical outfit is only $70. The hospitals are supported by charity and a part of the gains of the lotteries.

REPORT ON THE U. S. S. COLUMBIA.

By C. G. Herndon, *Surgeon, United States Navy.*

The structure of this ship was fully described in the Bureau's report for 1895.

The *Columbia* passed from the reserve to the active list on March 15, 1898, at the navy-yard, League Island, Pa. Most of the officers reported on that day, and active preparations to fit for sea were at once begun. The ship at the time was anchored in the stream. The medical outfit arrived promptly at the navy-yard; unfortunately, however, the sick quarters were utterly unfit to receive the stores, owing to the fact that when the ship was placed in reserve the dispensary and forward storeroom had been torn to pieces. This condition was immediately reported, and every effort was made to fit them out, but it was not until March 28, after the ship had left her anchorage off the navy-yard, bound to sea, that the medical stores could be unpacked. No hospital steward was sent on board until March 23, and no hospital apprentice until the 28th. During this interval there was much sickness among officers and crew. The medical officers of the navy-yard and receiving ship aided me all they could by supplying medical stores, which were prepared by their apothecaries.

The obvious lesson from this experience is that the sick quarters should have been left undisturbed when the ship went into reserve, or the proposed alterations should have been made at once and not postponed, and also that the hospital attendants should be sent on board with the first draft.

From Philadelphia the ship went to Hampton Roads and became a part of the "flying squadron." During our stay in these waters the special war stores, consisting principally of liberal supplies of whisky, brandy, chloroform, ether, and surgical dressings, were received. The medical storeroom is in the extreme after end of the ship and beneath the protective deck, and the sick quarters are in the extreme forward end of the ship.

The present storeroom is unsuitable in every way and should be exchanged for one which is just beneath the sick bay and above the protective deck; the latter is easily entered through a hatch in the sick bay country. Great difficulty was experienced in getting these special supplies down into the storeroom, and in fact the boxes containing the surgical dressings would not go through the various hatches, and had to be cut in two before they could be struck below. A very accurate description of the medical storerooms and of the one below the sick quarters appears in the report of the Surgeon-General of the Navy for 1895, and it is not necessary to repeat it here. The statements made then are equally true to-day. In my opinion, the present sick quarters are totally unsuited to the needs of the crew. Situated in the extreme bow, on the berth deck, it is with the greatest difficulty that sick and injured men can be carried below and brought above through the narrow hatches and up and down the almost vertical ladders. When steaming at any speed, the vibration forward is so great that I found it impossible to write. What is of more importance, I doubt if it would be possible for a fractured bone of the lower extremity to be immobilized. If there is any sea on the air ports must be kept closed, and usually there is so much spray coming over the bow that the wind sail is hauled up. The apparatus for artificial ventilation does not suffice by a great deal. About six men can be berthed on the cofferdam; there is no room to swing a cot.

I am fully satisfied from my experience here that neither medical officers nor the attendants can do efficient work in this compartment when the ship is at sea, and particularly so when in hot climates. There being no question about the accuracy of this statement, how can sick or injured men recover promptly and thoroughly if required to remain in this compartment?

The following statement shows in addition how unsuitable the present quarters are: As is well known, while the ship was on patrol duty much of the cruising at night was done without lights and the battle ports were at sundown put in the place of the glass ones. For some reason the former, in the sick quarters, leaked badly and could not be used; to obivate this difficulty, the latter were painted, so that in the daytime the quarters were in total darkness, unless artificial light was used.

A much better place for these quarters can be had on the gun deck in compartment No. 122 A. This deck is so high above the water line that a constant supply of light and pure air would be available for sick and injured men. No guns occupy this space and the berthing billets which are now here could be transferred to the present sick quarters; thus no claim could be made that the proposed change took away space from the crew.

Supposing it likely that this ship would be engaged in battle, preparations were at once made to receive and treat the wounded. Two stations were established on the gun deck; the sick quarters were impracticable on account of their inaccessibility. One station was in the wardroom mess room; here the dining tables and transoms would serve useful purposes. The senior medical officer, with 1 hospital apprentice, 4 marines, and such officers as might offer to assist, occupied this compartment; he was also to use the cabin if it would serve a useful purpose. The junior medical officer, with hospital steward, the other hospital apprentice, 4 marines, and volunteer help, took station forward, in compartment 122 A. He was also to have the use of the junior officers' mess room, if it could be utilized. "Carriers" of wounded were to be detailed from each gun division. Instructions were given in the applications of tourniquets, bandages, splints, etc.

Believing that if many men were wounded the supply of tourniquets, though liberal, would not be sufficient, I requested the Bureau to furnish a large quantity of strong rubber tubing, which, when cut into proper lengths, makes an admirable tourniquet, which can be very promptly and securely applied. The Bureau acted promptly and favorably on the request.

In the light of the experience gained during the anxious months of the war, there is only a single item that I would ask for in addition to the exceedingly liberal armamentarium supplied this ship by the Bureau, and that is an abundance of first-dressing packets, such as the Esmarch's first help for wounds.

The *Columbia* remained in Hampton Roads and adjacent waters under steam and ready to go to sea in an hour or so after reception of orders, until about April 24, when she was detailed for coast patrol duty. This entailed constant cruising day and night; most of the ports on the coast from the capes of Virginia to Eastport, Me., were visited. During much of the time the cruising at night was done without showing any lights or using fog-signals. On June 26 the ship sailed for Key West, Fla., where we arrived June 30.

On the night of July 3 the ship sailed from Key West for Charleston, S. C., and arrived at 6.30 a. m. July 5, but on account of deep draft, anchored about 9 miles from the city. On the 8th we received on board a battalion of the Sixth Illinois Infantry, 318 officers and men. By order of the Navy Department these troops were to be transported to Santiago de Cuba, and we at once sailed for that place, where we arrived at 4 p. m. July 11. These men came from Camp Alger, Va., where they had been for many weeks. However, the troops of the Sixth Illinois Infantry remained on board, and day after day passed without their removal.

The enlisted men of the battalion occupied any place in the ship they could get. These troops brought some provisions with them, but were ultimately rationed from the ship's supplies; they were inadequately supplied with underclothing, for the frequent changes which the hot weather made necessary, and knew little, if anything, about the proper hygienic care of their persons, of taking care of their clothing, or preparing their food. Our men assisted them in every possible way.

From Santiago de Cuba the ship was sent to Guantanamo Bay, Cuba, with the troops still on board; from that place we sailed for Porto Rico on July 21, and arrived at Guanica on the 25th, where the soldiers who had been on board since July 8, seventeen days, were debarked. The addition of these 318 men to the personnel of the ship greatly overcrowded her, and as they were from Camp Alger, Va., it was but natural to anticipate an outbreak of typhoid fever. When they left the ship, the volunteer medical officer with them stated that during the seventeen days they had been on board 51 had been sick with a form of simple (?) fever, which he attributed to the influence of ship life, to which they were entirely unused; also that there had been some diarrhœa, some muscular rheumatism, etc. In the absence of suitable medical records it was quite impossible to keep up with the exact condition of these men. The cases were regarded as highly suspicious.

On July 27 we went to St. Thomas, Danish West Indies, for coal, and arrived at Ponce, Porto Rico, on the 30th.

While the troops were on board, the ship was so crowded that fully 50 per cent of our men could not sling their hammocks at all, but slept about the decks wherever a place large enough to lie down could be found.

OUTBREAK OF TYPHOID FEVER.

On August 3 a coal passer was admitted with what was shortly afterwards diagnosed as typhoid fever. Between this date and August 25 12 more cases of typhoid, of varying degrees of intensity, developed. A very interesting fact in connection with these cases is, that eight were coal passers and belonged to the same mess. The most thorough search failed to show anything about the ship, the water, or the rations to account for this outbreak. In view of this fact, there is no doubt, I think, that the troops brought the germs of the disease on board with them from Camp Alger, and I now believe that many of the cases of diarrhœa and fever which affected the soldiers when they left us were incipient typhoid.

I think the reason that most of our cases of typhoid were men from the fireroom is due to the fact that coal passers and firemen would come up from below more or less exhausted by their work, and therefore their power of resistance to morbid influences was correspondingly decreased. They would lie down anywhere on deck wherever a vacant spot could be found, and often were scattered about among the soldiers.

That the germs of the disease were very generally diffused, so to speak, in the ship, is shown by the fact that among those taken was an apprentice, who was a signal boy, and spent most of his time forward on the bridge; the fireroom force of course worked below, but messed amidships on the gun deck.

On August 16th the ship was ordered to Philadelphia, via Key West, and arrived at League Island on the 26th. On the following day we transferred to the naval hospital, Philadelphia, all the fever cases remaining on board, 10 in number, the three earliest cases having been sent north via the *St. Louis* and *Relief*.

FOOD.

Officers and men lived during the cruise on purchased food and the navy ration. The latter, of course, is of good quality and abundant, but a very large part of its nutritive value is lost in preparation; as has been so long known, the men really have no cooks, and consequently much of their food is wasted by the so-called "berth-deck cooks," who are incompetent. It is a fact, too, that these messmen throw overboard large quantities of food after the men leave their mess table rather than take the trouble to put it away for use at the next meal.

The officer's messes use large quantities of the ship's provisions (and condensed cream instead of milk), which, with rare exceptions, was of good quality. During our cruise in Cuban and Porto Rican waters we drew fresh refrigerated beef, potatoes, onions, and ice from the Government supply ships, for both officers and men. All these provisions, as far as our experience went, were of excellent quality, and were eagerly sought and consumed, fore and aft, with much relish. The fresh-provision ships were regarded by the officers and men of this ship as great blessings. The beef was received as quarters, done up in canvas bags. As soon as it came on board it was cut up and put in cold storage and then issued as required. If the men's food could be properly prepared by competent cooks, but little would remain to be wished for.

NATIONAL RELIEF COMMISSION.

While we were at Ponce, Porto Rico, the yacht *May*, with the president and other members of the National Relief Commission, came in. She was loaded down with medical stores, clothing, and sundries of all kinds for distribution to the sick and wounded men of the Army and Navy. Among articles sent to this ship was a superior grade of ginger ale, which was, when given on cracked ice, more relished by our fever cases than any other drink we could furnish them. I think it would be a valuable addition to our medical supply table. I certainly never have seen sick men on board ship enjoy anything so much.

In connection with this subject of refreshing drinks for sick men, I would suggest the substitution of condensed cream for the condensed milk. In the officers mess we used this cream very extensively. I can not recall a single instance of a sick man taking with relish anything made out of condensed milk. The cream, on the other hand, was relished by both well and sick. It answers admirably not only in tea, coffee, and chocolate, but serves an excellent purpose in the preparation of punches, eggnog, etc.

ISSUE OF ALCOHOLIC STIMULANTS TO EXHAUSTED MEN.

A number of men at various times were more or less overcome by heat in the dynamo, engine, and fire rooms, and were promptly brought to the sick quarters. The heart, and not the brain, was the organ which had given out among these men. The routine practice was to stretch the man out on the cofferdam, with the head low, loosen all tight clothing, and give him a liberal dose of whisky or brandy with digitalis. Usually, in a short time he would go off into a quiet sleep, and wake up ready for work.

I am opposed to the routine issue of alcohol to the men below while on watch; but from my experience, and more particularly on this ship, I believe it would be well, if the Bureau sees fit to do so, to increase the amount of whiskey in the medical supplies and allow the medical officers to give it to deserving men coming off watch when they show markedly the effects of the long exposure to the high temperature in which they work.

I have seen various stimulants used, but nothing, in my experience and belief, does these men as much good when coming off watch as a ration of whisky diluted with water, and, if necessary, with some digitalis added.

ATTENTION TO THE TEETH OF MEN AND APPRENTICE BOYS.

I beg to call the attention of the Bureau to the importance of having, on receiving ships, dentists, who should overhaul the teeth of men and apprentices as soon as they come on board. Now that we have a regular hospital corps, the steward and hospital apprentices could in a very short time become proficient in this important work. A very large number of teeth are sacrificed on the cruising ships because they ache. Most of these, if properly attended to while the man was on board the receiving ship, would have given no trouble after going to sea and being exposed to weather and temperature changes. The welfare of the men is so carefully looked after in all other respects that I think this matter is of sufficient importance to command prompt attention.

REPORT ON THE U. S. S. MASSACHUSETTS.

By S. H. Dickson, *Surgeon, United States Navy.*

As a part of the North Atlantic Squadron the *Massachusetts* spent nearly eight weeks of tedious and anxious service, from January to March, at Dry Tortugas previous to hostilities, engaged in active and constant drill. Then followed the return north to be attached to the flying squadron, the voyage to Key West in May, the departure thence to Cuba at the breaking out of the war, the six weeks of blockade and participation in the engagements with the enemy's batteries off Santiago, the expedition to Porto Rico and back to Cuba, and the return home in the latter part of August.

The remaining months of the year were occupied in a visit to Boston, and return to New York Navy-Yard for necessary overhauling and repairs.

In the anticipation of war the efforts of the surgeons of the ship were redoubled to bring the medical department up to the highest possible state of efficiency, and in these they were warmly seconded by the commanding and executive officers. The fighting force was constantly drilled in "first aid," stretcher bearers told off and given practical instruction in the handling of the wounded, and immediate dressings were distributed to the various gun crews at their stations. The surgeon's station, just inside the citadel on the port side, and at the foot of the only ladder leading to decks above, and partially protected, had been prepared with all necessary appliances within easy reach, and his division so trained that within four minutes from the general alarm to quarters everything was reported ready for the reception and treatment of the wounded. Happily there were none to care for, as this ship shared in the remarkable good fortune of the rest of the squadron in the engagements with the enemy's batteries off the entrance to Santiago Bay, no one of the officers or men exposed having been struck by the shells which fell thickly around us, their fragments on more than one occasion coming on board and doing slight damage. Nor are there any injuries of the ear drum to report, although such accidents might readily be expected from the concussion of the guns which, large and small, were fired at least four hundred times. This was doubtless due in great part to the excellent fire discipline in so placing the ship that the gun blasts would do the least possible harm to the crews immediately at, beneath, and around them. Besides this, all were supplied liberally with cotton for the ears, and this may have assisted in preserving them from ruptures of the drum.

I had been led to expect, under the circumstances of war and during a close blockade and operations in the tropics of such duration in the summer months, that many cases of heat prostration among the 100 men of the engineer force would be encountered. With fires lit all the time, and steam all over the ship; bottled up, so to speak, every night, with temperatures in the fire rooms frequently and for hours at a time from 144° to 150° F., in the engine room rarely below 120° F., conditions were constantly favorable for their development; and yet but 14 cases in all were admitted to the sick list, and these occurred after the removal of the strain and excitement of actual hostilities, and were none of them of a serious character. Careful hygienic measures, such as frequent opportunities for bathing and washing, and the intelligent and constant use of the ventilating blowers, supplying an abundance of fresh air, undoubtedly led to this result. On only one occasion, and for a brief period during the voyage from Porto Rico to Cuba, was it considered necessary to issue a small spirit ration to the engineer division. It put heart into the men and was productive of nothing but good. It was given to each watch on coming off duty and after they had washed and cooled off.

The sanitary condition of the ship has been exceedingly good, considering the faulty construction of the "head," attention to which has been called in a previous report. In a head sea and with everything battened down forward, its ventilation is defective, and pungent and foul odors reach the berth deck through the communicating door in spite of every attention to flushing and disinfection. This evil might be remedied if it were possible to connect this compartment with an independent exhaust, as at present it shares in the general system of direct supply.

The health of the ship has been excellent. There were 3 deaths during the year, one of them by drowning. On May 5, 1898, a case of measles appeared among the crew at Hampton Roads, which was promptly sent to hospital and measures taken to prevent the spread of the disease. But one more case developed at sea, twelve days later, which was at once discovered and isolated by placing it in the steam launch in the cradles on bridge deck, and sent as soon as possible to hospital at Key West; this ended the matter. Mumps broke out on November 1 at navy-yard, New York, brought from shore in some way, and was confined to 3 cases, all of which were sent to hospital. Two cases of typhoid fever, contracted ashore in New York and sent to the New York Naval Hospital, comprised all the cases of infectious diseases.

We did not escape the usual invasion of malarial fever while off the oast of Cuba and in the port of Guantanamo, although our men had little or no communication with the shore. Nearly all the cases, 32 in number, of which 8 were admitted as remittent and 24 as intermittent, pursued an irregular course, and while comparatively mild—save 1, which died—were rebellious to the ordinary treatment by quinine, and did not in the temperature charts resemble the type common to such cases in our Northern country.

The satisfactory health of our complement during the war, necessitating such close confinement for months at a time and in the heat of a tropical summer, was greatly due to the excellent commissary arrangements. Supplies of good fresh meat and wholesome vegetables were forthcoming at sufficiently frequent intervals, and while there were occasional complaints, I do not recall any general condemnation of such food. The usual preserved canned rations were of first-rate quality. No water except that distilled on board was ever used for drinking or culinary purposes, and it was of excellent quality and sufficiently abundant for all purposes.

I think that it is only due to the administration of the Bureau of Medicine and Surgery to place on record in this report the promptness, liberality, and foresight with which this ship was furnished from the beginning to the end of the Spanish war with medicines, surgical appliances, hospital stores, and comforts for the sick. Despite the inevitable difficulties encountered in supplying at such short notice immense quantities of these articles to so many vessels, with the serious obstacle of transportation and delivery, I wish to state that from first to last the medical department of this ship was never short of anything which could conduce to the well-being, comfort, or treatment of the sick. On more than one well-remembered occasion I received from the *Solace*, whose work merits the highest praise from every officer and man in the naval service, quantities of delicacies, fruit, and articles of clothing, etc., donated by patriotic women of America, who little appreciated the value of their gifts or the gratitude of the suffering recipients of them, sweltering for weeks under a burning sun and shut up in the superheated and confined air of a floating steel fortress.

A visit to the *Oregon* when off Santiago impressed me with the possibility and advisability of following the arrangements which exist there in the location of the water-closets for wardroom, junior, and warrant officers, and a letter to that effect was written to the commanding officer, recommending that the corresponding closets here should be removed from the berth deck and placed, as in our sister ship, on the gun deck, immediately beneath the 8-inch turrets aft, where there is clear access to the outer air and where flushing by natural fall can be obtained. At present these closets practically ventilate into the ship, and in spite of the greatest vigilance, the intricate flushing system will at times get out of order and constitute a nuisance and a menace to health. I strongly urge that this improvement in sanitation be carried out while the ship is undergoing her present repairs at this yard.

Work will soon be commenced in removing all the woodwork from cabin, wardroom, and junior officers' quarters and from the outboard rooms of the ship, to be replaced by a thick, nonconducting asbestus material, as protection from fire in action and from the extremes of heat and cold; the bunks will also be removed inboard and made of a folding pattern. This is a needed improvement as a measure of health, and should not stop short of the officers' quarters, but be carried forward on the berth deck to include every living compartment, as extremes of temperature are met with there as well as aft.

REPORT ON THE U. S. S. MONADNOCK.

By John M. Steele, *Surgeon, United States Navy.*

In June this vessel was under orders to make preparations to go to Manila, Philippine Islands, from Mare Island, Cal. The adequacy of the distiller to make sufficient water for ship's purposes was questionable, and only sufficient with the greatest economy. The storage capacity of the water tanks, about 4,000 gallons, was recommended to be doubled. Four tanks with a capacity of 250 gallons each were placed in the main hold, increasing the storage capacity by 1,000 gallons.

The possibility of having bad weather, and the ingress of fresh air limited with the main hatches closed, a plan was devised by the carpenter, with the approval of the captain, to cover in the top of the main hatches with strong iron plates, made into two sections and bolted down upon the hatch coamings as they flare outward. This was made water-tight by a rubber gasket. The after section of the after plate over the after hatch was perforated by a large hole, upon which was fitted a ventilating shaft with a movable cowl, high enough to catch the wind ahead over the turret. The forward section of the after plate was made larger than the after one, and was intended to be removed in good weather, so that it would not be the means of keeping out any more air than was avoidable. This device does not interfere with the closing of the battle plate, which is operated from below. The same plan was adopted for the forward hatch. These two ventilators were strong and high, so that they could be kept in operation in almost any weather. There were three days, on leaving San Francisco, that the seas were sufficiently heavy to have kept the hatches closed, and about eighteen hours in the China Sea, so that on this passage this contrivance proved a drawback rather than a help.

The plate which was intended to be removed, and which was removed once, was put in place and not taken off again; the time required to unbolt and rebolt it was too long. The three days on leaving San Francisco and the eighteen hours in the China Sea demonstrated what adjuvants they are in introducing fresh air into the vessel.

For prolonged trips I commend this plan, with a ready means of closing and opening one section of the plate; and I am informed this could be very easily done, and there would be no shutting out of air, and a means always ready in any weather for the introduction of fresh air.

We steamed out of San Francisco Bay on the 23d of June, arriving in Honolulu, Hawaiian Islands, on the 3d of July. On the passage over the evaporator room proved to be so hot as to necessitate some means of cooling it. An opening was made through the deck and a shaft fitted and leading above the superstructure with a cowl. This proved to be of great benefit.

The question of increasing the cubic capacity of the junior officers' quarters to its original size was talked of but not acted upon. The cubic capacity at present is about 1,000 cubic feet, with one exhaust louver and one supply. Seven officers messed there on the passage over. The space is inadequate and should be enlarged to its original size. During the passage to Honolulu the distiller proved faulty, the coils leaking and permitting salt to get into the water.

We left Honolulu on July 13 and arrived at Guam, one of the Ladrones, on August 3; left Guam on August 6 and arrived at Manila on August 16. Since then the vessel has been in Manila Bay.

In reviewing the unusual passage of this vessel one can not but be impressed with the enterprise of sending a craft of this type upon such a long and hazardous trip. Built for a coast and harbor defense monitor, she has accomplished a feat, together with the *Monterey*, that, but for the urgency of the case, would never have been attempted.

There is no class or type of vessel so dependent upon the perfect working of every piece of machinery, for the integrity of and preservation of the whole structure, as this. In order that the vessel move with precision it is necessary that the machinery, in all its complexity, move synchronously. That such concurrent action take place it becomes necessary that the officers and crew be guarded and looked after with a constant and unselfish care, that their health and strength be preserved.

On entering the tropical zone, where the temperature of the air and water are nearly the same, and high, about 84° F., the vessel heated up rapidly and remained so.

The hottest part of the vessel in which men live is the superstructure and warrant officers' quarters. The warrant officers' quarters are next to the dynamo room, and separated by an iron bulkhead, and in the forward room the temperature averages about 95° F. In the superstructure is situated the cabin and wardroom, officers' quarters, also the galley, the officers' water-closets, and men's head. These apartments are directly over the fire and engine rooms, and the heat here is high and continuous night and day, with an average of about 94° F. There is a slight remission in the early morning hours. In addition to hatches, deck lights, and air ports, the present means of ventilation should apply to the superstructure and an active method of introducing fresh air, which could be accomplished by two additional blowers, to force air into the entire vessel. This addition would combine the plenum and exhaust, which I believe is necessary for the best effect for the health of the crew.

In one of the rooms opening into wardroom temperatures of 102°, 100°, and 98° have been noted. The metal around the contrivances for operating certain mechanisms in the engine rooms and fire rooms from the wardroom get so hot that it is very disagreeable, if not painful, to touch with the naked skin. The deck is very hot also. During dinner hours the wardroom is lighted with electric lights, adding their quota of heat, and it becomes so very warm that one frequently left the table without completing the meal; 97–98° F. are temperatures frequently noted. The fact can not be too strongly urged that some means should be adopted by which the temperature of the wardroom can be lowered or the situation of the quarters changed. I can not say too emphatically that the health of the personnel being a sine qua non of an efficient condition, this vessel can never give a longer service with the same officers and crew than one year in the tropics.

There is one other feature in the system of ventilation which was noted on going below. After the exhaust fans have been running five or six days there is a lack in quantity of air, as manifested by a desire to breathe more rapidly and taking a deeper respiration, and breaking out into a profuse perspiration. These phenomena occur almost immediately on going below to the berth deck.

In addition to the hatches, when in port more ventilators should be used on deck lights.

On the passage across the Pacific there were 5 cases of sickness for the same time than any other during the year. There were 5 cases of heat exhaustion, 2 not admitted, and all recovering quickly. The largest number of admissions and sick days for any quarter during the cruise of this vessel is the one for the fourth quarter, 1898. This is largely due to the increased number of venereal diseases. An unusual number of such cases have been contracted since the 16th of August, 1898, the date of arrival at Manila.

The distance traveled during the year was about 11,172 nautical miles.

The following is taken from John Foreman's book, The Philippine Islands, published in 1892:

> Southwest monsoons bring rain to most of the islands. The wet season lasts about six months, commencing the middle of April; the other half comparatively dry. The reverse of this is true for the Pacific coast.
>
> The hottest season is from March to May, inclusive, except on the Pacific coast, when the greatest heat is felt in June, July, and August. The temperature throughout the year varies but little, the average for Luzon being about 81.5° F. The average number of rainy days for the years 1881, 1882, and 1883 were 203. Although Manila lies low, the climate is healthy, and during years of personal experience I have found the maximum and minimum temperatures at noon in the shade to be 98° and 75° F. The climate of Manila may be summed up as follows: December, January, and February, delightful spring; March, April, and May, oppressive heat; June, July, August, and September, heavy rains; October and November, doubtful.
>
> The last census was in 1876. The total number of inhabitants, including Europeans, was shown to be a little under 6,200,000. The increase of population was rated at 2 per cent per annum. In the city of Manila and wards it is calculated that there are about 300,000, of which the ratio of classes is about as follows:

	Per cent.
Pure natives	67
Chinese half-breeds	16.65
Chinese	13.30
Spaniards and creoles	1.65
Spanish half-breeds	1.30
Foreigners, other than Chinese	.10
Total	100.00

Some of the diseases most common to Manila are the paludal fevers, dysentery, diarrhœa, and skin diseases of the vegetable parasitic class (tinea tricophytina). Leprosy exists in Manila, and also smallpox.

REPORT ON THE U. S. S. TEXAS.

By Clement Biddle, *Surgeon, United States Navy.*

The health of the officers and crew has been on the whole good, notwithstanding the outbreaks of typhoid fever, diarrhœa, and grippe that occurred on board in the last four months.

During the war but one death took place from injury received in battle, and that by the entrance of a shell into the forward part of the gun deck, which cut a man almost in two, besides wounding eight others; all of the others were injured but slightly and soon recovered. During the action with Cervera's fleet no one was even wounded, strange to record.

The water supply in daily use aboard is not as pure as it should be, because it nearly always contains more or less salt, has a flat, insipid taste, sometimes like that of cement, and generally deposits a reddish brown sediment after standing a while. The impurities in the water are of mineral nature, and no deleterious influence upon the health of those using it has been noticed.

Whenever fresh water, either from the shore or that supplied by a Government water boat, has been taken aboard it has before use been run through the condensers.

Between October 3 and 11 an epidemic of diarrhea appeared in the ship while at the New York Navy-Yard, so many as 20 cases having been treated October 4. In this outbreak 32 cases were under treatment and 5 placed on the sick list in the period of about one week. I attribute the cause of this diarrhea to the eating of some bad meat that was sent aboard by the contractor.

Typhoid fever broke out in the early part of October, and I insert here an abstract from a report I made relating to it to the Bureau under the date of November 10, as follows:

> The first case of typhoid fever appeared October 11. The ship was then tied up at the river front of the cob dock, Brooklyn Navy-Yard; from October 11 to 19 at Tompkinsville; October 21 to November 1 at Philadelphia; afterwards the *Texas* returned to Tompkinsville, November 3. The cases kept on reporting themselves at the sick bay as follows: October 15, 1; October 19, 1; October 20, 1; October 21, 1; October 23, 1; October 25, 1; October 26, 2; October 29, 3; October 30, 1; November 1, 1; November 2, 1; November 5, 2—17 in all. This omits one or two doubtful or maybe abortive cases. Two of the above were transferred to the naval hospital, New York, and 11 to the naval hospital, Philadelphia, these transfers being effected in from two to seven days after the disease had declared itself, so that no extended clinical history can be given.
>
> It can be asserted that all corresponded closely to the text-book clinical descriptions. In all, however, there was an unusually brief premonitory history, followed by headache, some diarrhea, and decided prostration. The average age of those attacked was $24\frac{1}{2}$ years. Almost all the cases have been confined to three messes, and in these fresh unboiled milk had been in pretty general use, which, it is stated, was obtained from a certain dairy of Brooklyn.
>
> The sergeant of marines testified that no milk had been served in the marine's mess, and they have been exempt from infection. Likewise the disease did not attack any officer.
>
> The fleet surgeon, Medical Inspector Charles U. Gravatt, United States Navy, was called in to assist in investigating the cause, and the above facts were elicited in regard to men and messes. The men questioned stated that the suspected milk came from the dairy named. It is my intention to have a sample of this milk analyzed at the Hoagland Laboratory, Brooklyn. Since the outbreak of typhoid fever appeared on board this vessel the following measures against the spread of the disease have been taken, viz: No milk allowed aboard, everything connected with the sick bay, the bedding, utensils, water-closet, etc., disinfected, and the ship's water tanks flushed and steamed.
>
> At the present writing (November 10) no new cases have appeared since November 2 to 5, about which dates four mild ones were admitted to the list and retained aboard. Two deaths have occurred, one, age $21\frac{1}{2}$ years, admitted October 11, and another, age $18\frac{7}{12}$ years, admitted October 26. The mortality in this epidemic made the percentage of deaths 12.
>
> The epidemic reached its height between October 17 and 31, when the temperature of those attacked quickly shot up to high fever, in one case reaching $105\frac{2}{5}°$, and it was among these cases that the deaths took place.
>
> Thenceforth the infection seemed to have spent its virulence, as shown by the milder clinical symptoms of those attacked.

A good many cases of grippe have appeared in this vessel, the first coming under notice November 20 while at Old Point. Of these, 19 have been ill enough to be placed on the list, and about 30 prescribed for. Great prostration has been a marked feature in nearly all these cases.

It is unpleasant to admit it, though nevertheless the fact, that all of the therapeutical measures administered to relieve the grippe have at best but ameliorated the symptoms, and in no sense modified the course of the disease.

This ship has now been in Havana since December 17, during which time the health of officers and crew has been excellent. No liberty has been granted the latter. The sanitary precautions prepared by the Bureau April 8, 1898, and issued by the Navy Department, have been carefully observed while in Havana.

I submitted to the health authorities of Brooklyn, N. Y., last November the fact that typhoid fever had appeared in this ship, at the same time naming the probable source of infection as coming from two dairies, the milk of which they promised to examine. I have as yet had no answer.

REPORT ON THE U. S. S. MONTGOMERY.

By Lloyd W. Curtis, *Surgeon, United States Navy.*

The year has been one of exceptional activity afloat. One hundred and thirty-one days were spent at sea, during which time the ship steamed 17,344 miles, not including six weeks on the Havana blockade.

The total number of admissions to the sick list was 300, and the total of sick days 1,793, giving a daily average sick list of 4.90. This abnormally large number of admissions to the sick list as compared with the previous year, when the number was 184, with the total number of sick days 1,198, is due to a temporary epidemic of grippe during the second quarter (26 admissions, 166 days), and an outbreak of malarial fever during the fourth quarter, with 26 admissions, and total sick days 166. The exceptionally arduous service had no appreciable influence on the general health of the ship's company apparently in itself.

The cases of catarrhus epidemicus developed in April, directly after a visit to the navy-yard, Norfolk, Va., where the disease prevailed at that time. The cases of malarial fever occurred in October, while the ship was en route to Nassau, Bahama Islands, from Hampton Roads. The trip was a very stormy one, and the crew much exposed to wet, as always in this ship in stormy weather.

The *Montgomery* came north early in September, and the intervening time had been spent at Newport and Providence, R. I. There had been no malarial manifestations while in the tropics. The cases yielded readily to antimalarial remedies.

The beginning of the year found the *Montgomery* engaged in suppressing filibustering on the Gulf coast, and when hostilities broke out became an active participant in the war. Just previously several ports in Cuba were visited, namely, Havana, Matanzas, Santiago; also San Domingo, Haiti, and Samana Bay and Port Antonio, Jamaica. The Bureau's sanitary instructions were vigorously observed while at these ports.

The attack on the defenses of San Juan, Porto Rico, was participated in by the *Montgomery*. On this occasion and on all others when an engagement was expected the commanding officer turned over his cabin for hospital purposes, and the fullest preparation was made for temporary treatment of the wounded, namely, the checking of hemorrhage and transfusion with sterile normal saline solution, treatment of shock and pain, and the application of first-aid dressings, of which an abundant supply was furnished to the crew, who had been fully instructed in all first-aid procedures.

Preparations for battle on the part of the medical department included a thorough antiseptic toilet for the surgeon and hospital steward, after which sterilized gloves were worn, and explicit instructions to the hospital apprentices and first-aid men against the infection of wounds by ignorant inadvertence on their part.

No casualties were inflicted by the enemy during the war, and no accidental wounds, except in the case of the first sergeant of marines, who shot himself in the right forearm with a navy revolver while the ship was at Key West (whether by accident or design is uncertain). He was immediately transferred to the army hospital, Key West, for operative treatment, the radius having been fractured. His urgent desire to get out of the service, together with the circumstances attendant, laid him open to the grave suspicion above noted.

In closing this report, which is the final one of a three years' cruise in this ship, I desire to state that, in my opinion, in no service in which this ship has been engaged during the past three years has the ship's company been subjected to so great general discomfort and to so many conditions adverse to health as have been the unavoidable conditions incident to two prolonged periods spent at navy-yards during the winter season with the ship undergoing extensive repairs. It is hardly necessary to detail these conditions, which are appreciated by all officers, as the experience is more or less common to all ships in commission.

The remedy I would suggest is a barrack building at the principal yards where the crew could be housed and fed and berthed during the time the ship is under repairs, and without the transfer of official authority, as is the case or would be the case should receiving ships be utilized for this purpose.

REPORT ON THE U. S. S. MIANTONOMOH.

By F. W. F. WIEBER, *Surgeon, United States Navy.*

The ship was placed in commission at the navy-yard, League Island, Pa., March 10, 1898, and left for Key West via Charleston, April 22, 1898, where she arrived May 5. Having been ordered on blockading duty the ship joined the Havana blockading squadron, leaving Key West May 19. Detached from this duty temporarily, she helped to guard the "old Bahama Channel," forming a part of Admiral Sampson's fleet. She returned to Key West June 3, where she remained until June 14, on which day she again left for blockading duty off Havana, returning to Key West June 21. After completing necessary repairs she returned to the same duty off Havana August 3, returning to Key West after the preliminaries of peace had been signed, August 14. August 19, after yellow fever had made its appearance in the latter place, the ship left for Dry Tortugas, remaining there until August 25, and leaving for Newport, R. I., in obedience to orders of the Navy Department. The ship arrived at Newport September 6, and left for Philadelphia via New York September 29, arriving at her destination October 1, where she was placed in reserve early in November.

Until October 1 the ship spent one hundred and fifty days in port and fifty-five days at sea. Five hundred and ninety-eight sick days were reported up to that date. Ten men were sent to hospitals, 2 were invalided from the service; only 3 cases of venereal disease were put on the sick list. No deaths occurred; no casualties were incurred, as the ship did not take a very active part in the war.

The complement of the ship fluctuated from between 150 to 170 officers and enlisted men.

The ship had been out of service for about four years, and was in very bad condition, when suddenly recommissioned. Her decks above and below were filthy. For weeks, after March 10, the navy-yard workmen worked on her day and night to get her ready for sea, spending most of their energy on her most essential parts—namely, machinery, turrets, and guns. Minor matters, which at any other time would have received greater attention, had to be overlooked, the only feeling prevailing being not to delay the sailing of the ship to the seat of war.

The part of the ship allotted to the medical department consisted of a small storeroom in the after part of the ship and a very small dispensary, located in the hottest and noisiest part of the ship—namely, the forward turret compartment—which was at the same time the dynamo compartment, and contained also the galley, which had to be used at sea whenever the weather was at all rough. The dynamo exhaust pipe passed through the dispensary, adding to its heat. Actual measurements have shown that the temperature in the dispensary has reached 109°. Salol melted in its bottles. There being danger of tinctures and fluid extracts being rendered unreliable in consequence of evaporation, these, as well as all rubber goods, were removed and put into the storeroom. This uninhabitable place was assigned as the living place of the apothecary. Of course he could not live there, and could only exist by occupying billets, which were temporarily vacated by other men.

The stores supplied by the Bureau, as far as they were used, proved very satisfactory in every way, but they were in excess of our stowage capacity. The operating table and one chair could not be stowed at all and were left at the League Island dispensary. The mattresses supplied, had to be put into the sail room, where they were unavoidably soiled. The "antiseptic case" was part of the time in the wardroom country, partly in the wardroom storeroom. The test case, most of the liquors, the ether, and chloroform were stowed in the surgeon's room, crowding his personal belongings considerably. The stores put away into the storeroom were crowded to such an extent that in order to get at any stores it generally became necessary to break out everything. However, it being impossible to remedy any of the discovered defects about the department, and the chances being that all the stores sent might be of use, no reports were made at the time. The only work asked for was to have shelves built in the dispensary, and to have the deck overhead sealed with wood, to stop the condensation of moisture. The ship had no sick bay. While at League Island, during March and April, the absence of a place for the sick was felt very keenly. As it was, the men had to use their regular ship's billets, were in everybody's way, always surrounded by noise, and always uncomfortable. As soon as it became evident in any case that any serious illness existed, the case was immediately sent to a hospital, but until the diagnosis could be made the sick could not be made comfortable on board the ship. Later, after getting into Southern waters, this want was not felt at all; in fact, a sick bay located on the berth deck would have had to be abandoned on account of the great heat below. A "sick bay" was established under the after bridge on the superstructure in the open air. In rainy weather the sick were protected by a canvas curtain rigged up around the bridge. Fortunately we had but few sick and no serious cases at all. To take care of them under such conditions was a comparatively easy matter.

Soon after leaving League Island, other and indeed very serious defects were brought to our attention.

The artificial system of ventilation, which is so essential on a monitor, and which on this monitor had been so highly praised in former "sanitary reports," and which, while at Philadelphia, seemed to work very well, showed soon after many very grave defects both in machinery and in system. The machinery was old, and according to the report of the chief engineer of the ship the blowers could not be run as fast as they should be run to supply the necessary amount of fresh air to the living spaces.

In system it is objectionable—

1. Because it is at the same time a part of the "forced draft" system for the engine room. It allows of tampering and interfering with the direction of the current of the fresh air.

2. By a false setting of certain valves opening on the forward turret compartment, air exhausted from that compartment is mixed with the fresh air drawn in by the ventilators in the blower rooms, and redistributed to the berth deck.

3. The louvers about different parts of the ship are of the same size, whether nearer the center of distribution or not. The consequence is that while the passageways were always well ventilated, being closest to the supply, the cabin and the wardroom being farthest from the supply, were insufficiently ventilated.

4. Too much air is being wasted in the larger storerooms of the ship, some of them having as many as three louvers. Some of them were so comfortable that the petty officers in charge of them were in the habit of sleeping in them.

5. The two forward blowers, supplying the berth deck, are located in the hot forward turret compartment, in the blower room, which is only accessible from that part of the ship. They required frequent attention on the part of the machinist on duty. The large iron doors leading into the blower room were almost always found open, and probably kept open by the people employed in that part of the ship, although this could never be proven. By leaving this door open the hot air in this compartment had an additional way of escape, and this way of getting rid of the heat was undoubtedly employed by some of the crew.

6. The air propelled by these blowers, on its way forward, passes through ducts located in coal bunkers, which at sea were always very hot. Thus the air, which had already been heated during its passage through the blower room, especially on the port side, where its bulkhead is close to the ship's galley, became still hotter, so that when discharged by the louvers it felt hot to the examining hand. By measurement, at various times, it had reached 104° when ready for distribution. This probably explains the fact that the temperature

on the berth deck forward exceeded the temperature on the berth deck aft by 3° to 4° and that of the outside temperature by 20° and over.

7. In addition to the force system on this ship, there is also an exhaust system, which, in my opinion, on this ship is unnecessary. My opinion was formed in noticing that when battened down there was a strong current of air from both ends of the ship toward the engine room, with which both ends of the ship communicated freely. With air forced into a ship, freely communicating with a space, in which air is being heated and rarified, a constant circulation of air is bound to follow. I would recommend that, unless the whole system be changed, the exhaust system on this ship be transformed into an additional force system.

In the fire and engine rooms the temperature was high and a few cases of heat prostration occurred. It was noticed that a condition of disordered stomach predisposed to heat stroke and was present in every case which came under observation.

Cases of disordered digestion on board and especially at sea, when outside influences could not have had any bearing on this question, were of rather frequent occurrence, and were ascribed to the ship food. Often the salt beef and also the salt pork issued from the ship's stores were unfit for use. In some cases the fault undoubtedly lay in the poor preparation by the cook. Some of the cases of acute gastric catarrh were accompanied by considerable fever, great depression, malaise, headache, etc. Indeed, during the prevalence of yellow fever the possibility of this disease was always considered.

The distilled water was always excellent.

WATER-CLOSET SYSTEM IN USE.

The Bishop system was installed for both officers and men. It proved very unsatisfactory. It very easily got out of order, leaks were present from the beginning, and the pump worked unsatisfactorily. While in port the excreta of the men were discharged right into the water from the upper deck from a "head" especially rigged up in port.

It was found utterly impossible to keep the ship thoroughly clean, especially when battened down. On account of the great difficulty at such times of getting the slops and refuse on deck and of disposing of them in that way, undoubtedly a great part of this refuse found its way into the scuppers.

The berth deck was perhaps never in a thoroughly clean condition. Crowded, as it was, with the number of men attached to the ship, with no sunshine ever reaching it, poorly lighted, being the place where the meals were prepared, where the food was eaten and the dishes washed, with the pollution of the deck necessarily accompanying those acts, under these conditions the forward berth deck could never be in perfect sanitary state. It could only be satisfactory at times considering the circumstances. Fortunately for the men they did not have to sleep more than perhaps a dozen nights on the berth deck during this time. During our cruise in southern waters the crew slept almost without exception on the small open superstructure, not only without any injury to their health, but with absolute benefit to themselves. To this mainly I attribute the fact that the health of the crew remained excellent throughout. The officers did not have the same advantage. The superstructure was only large enough to accommodate the crew. However, whenever the weather permitted, while in port, some used the quarter deck for sleeping. With few exceptions the temperature in the staterooms ranged from 90° to 93° while in the tropics.

Complaints due to lowered vitality were becoming more frequent toward the latter part of our stay south, when, fortunately, orders were received to proceed to Newport, where, under the influence of the bracing climate and better food, those complaints quickly ceased.

During our stay at Key West yellow fever broke out twice. The first time it appeared in an isolated case which was treated at the marine hospital. It was believed in this case that the disease was contracted outside of Key West. General liberty was restricted, and officers were required to return on board before sundown. No new cases followed this first one and the restrictions were soon removed. The second time it appeared that the infection had started from Key West itself. Now, more energetic measures were adopted. All liberty was stopped; bumboats were kept away from the ship; the water-closets and scuppers were daily disinfected with 5 per cent solution of carbolic acid; bilges were cleaned frequently; no fresh provisions were allowed, which from their nature made boiling unnecessary; fresh provisions which required stowing below were not allowed; barrels containing necessary ship's stores were thoroughly washed with strong solutions of hydrargyr. bichlor.; boxes and wrappers of other articles were thrown overboard. Under these necessary restrictions, and especially after getting to Dry Tortugas, all the messes had to depend largely on canned provisions.

During the progress of active hostilities, the following arrangements were made to render assistance in time of action:

1. The ship's divisions received instruction in "the first aid to the wounded." This included the transportation of wounded on board the ship.

2. About 60 first-aid packages were prepared and placed in canvas bags which were distributed about different parts of the ship, to be made immediately available. These packages contained absorbent cotton, a powder of salicylic acid and boracic acid, a 3-yard muslin bandage, a piece of oiled silk surrounding the whole, and was held together by a safety pin. These packages, of course, were not strictly aseptic, as they had to be prepared on board the ship, but they were the best that could have been done under the circumstances. Each canvas bag contained 6 of these packages, 2 field tourniquets, 6 extra bandages, and 6 small, round wooden sticks, to enable one to tighten the bandage in case hemorrhage existed. This method of stopping bleeding was especially recommended to the crew. I would suggest that the rubber tourniquets take the place of our field tourniquets altogether. They could be used after the first dressing had been applied, and they would surely lead to the desired result, being used some distance above the wound.

3. The wardroom was reserved for the operating room.

4. A dressing station was put on the forward berth deck in charge of the assistant surgeon.

5. An arrangement for lowering a man from the superstructure was kept in constant readiness for immediate use.

RECOMMENDATIONS.

1. That the ship be supplied with a superstructure containing the living spaces, including a small sick bay and dispensary, the galley, and all the water-closets.
2. That a more modern ventilating system be provided for the ship, doing away with the exhaust system.
3. To add to the ventilation of the lower deck, numerous tall ventilators should reach from the lower deck through the superstructure to communicate with the open air.
4. That the wooden decking of storerooms be replaced by gratings, which allow of better cleaning of the deck and prevents the accumulation of water between the decks.
5. That ships be provided with sufficient lengths of steam hose to permit of thorough disinfection of any infected part of the ship.
6. Replace the present water-closet system by a different one.
7. That a larger storeroom be set aside for the medical department.

REPORT ON THE U. S. S. BENNINGTON.

By B. R. WARD, *Passed Assistant Surgeon, United States Navy.*

During the greater part of this year the *Bennington* has remained in Hawaiian waters.

In June a three months' trip was taken to San Francisco and up the coast, returning to Honolulu late in September.

The health of the crew during the first six months was excellent, save one death from pneumonia in April. During the next quarter there was a mild epidemic of German measles aboard, nine cases in all, presumably contracted at San Francisco from interchange of visits between the army camps in San Francisco, where the disease was prevalent, and our men.

During the month of November the ship made a trip to the island of Kauai, visiting the ports of Nawiliwili, Hanalei, and Waimea.

The natural beauty of this island far exceeds that of Oahu, where Honolulu is situated, and the bay of Hanalei presents a scene of most picturesque grandeur. As this was the first time an American man-of-war had been there since the annexation, we were everywhere treated with great courtesy and overwhelmed with attentions.

During December we visited the island of Hawaii, stopping at Hilo, Kealakekua (or Cook's Bay), Kailua, and Mahukona, the port of the large sugar-raising district of Kohala. At Hilo at present there is a very satisfactory, well-located, well-kept hospital. It is called the Hilo Hospital and was opened in October, 1897. It is situated a little distance behind the town on a slope of a hill. There are accommodations for 15 patients, but 25 could be received without too much crowding.

There is a good operating room and dispensary on the left as you enter, and on the right a reception room, with quarters for the matron and a linen room opening out of it. The kitchen is back of the hospital, but connected with it. The water-closets, of good design, are at the back of the wards. There is a complete disinfecting apparatus for mattresses, sheets, etc. The quarters for the servants are in a bungalow at a little distance from the main building. As the hospital consists of two wings connected by a narrow passageway, contagious diseases could be well cared for. The Government physician for Hilo is in charge.

During the last quarter there has been a large amount of venereal disease aboard. Out of four hundred and forty-nine sick days, one hundred and sixty-four were of venereal origin. This, however, does not give any idea of the number of cases treated. This increase of disease can probably be accounted for by the transports that have frequently stopped here with hundreds of men who were granted liberty. Under the circumstances the prescribed official weekly inspection of the women has seemed to be of but little practical use.

I have been told by reliable persons that venereal disease here, until within the last year, had been about the same as in other places.

During November I was enabled, through the courtesy of the president of the board of health, to visit the leper settlement on Molokai.

There is a positive decrease in the number of cases. The treatment for some time past has been only symptomatic.

As was to be expected, from the change of conditions and mode of life, there has been a certain amount of sickness amongst the soldiers of the army garrisoned in Honolulu.

After visiting one of the army hospitals, with the permission of the commanding officer, I volunteered my services, which were accepted.

I have had ample opportunity of studying a large amount of clinical material, and have been able to watch all types and varieties of febris enterica.

I was assigned to the charge of half a large ward, containing between 23 and 27 cases, most of them typhoid. This duty lasted over three weeks. Upon our return from Hilo I again took up the work, and was given charge of a ward of 50 cases, half another ward, and numerous venereal cases out in tents.

The work has been most interesting and valuable, and the absolute freedom and independence given me has been most gratifying. Starting in with a possible quota of 25 cases, which rapidly increased to many hundreds, a great responsibility was thrown upon the senior surgeon, Major Davis, of the First New York Volunteers. It has been with the greatest pleasure that I have seen him surmount all obstacles and out of chaos bring good order and discipline.

It was almost impossible to get milk at times. Eggs were scanty, and thus the very common necessities indispensable for sick people were not to be procured.

The mortality among a large number of typhoid cases has been less than 6 per cent, and among the total sick treated less than 1½ per cent.

When the fever first started, the Independence Park dance pavilion was arranged for a hospital. The location, on low ground, was unsuitable, but at the time the best to be obtained. Afterwards a small ward was hastily erected higher up, on the slopes of Punch Bowl. This hospital has been greatly increased in size, and is now used for the convalescent patients.

In addition, an old private house was hastily converted into a hospital. Around this as a nucleus have been erected wards, and tents have been pitched. A permanent location has not as yet been chosen.

The junior officers' quarters on this vessel, which had been temporarily used as a sick bay, had to be vacated at the commencement of the war on account of the assignment of a number of volunteer officers. It is earnestly requested that this space, or some other equally suitable, should be permanently assigned as a sick bay.

The recommendation by Surgeon Baker, in his report on the *Bennington*, concerning the obstruction of the after engine-room hatch by "building a solid and substantial bridge over it," has not been acted upon.

The artificial ventilation of the ship, as a whole, is of no avail, and some active measures should be taken to insure a better access of air to the forward fire room.

No ice plant has as yet been installed in this ship, and the accompanying discomfort while habitually cruising in the tropics is very apparent.

REPORT ON THE U. S. S. WILMINGTON.

By Frank C. Cook, *Passed Assistant Surgeon United States Navy.*

The *Wilmington* sailed for the South Atlantic Station from the Norfolk Navy-Yard, where she had been fitting out, on the 31st day of December, 1897, and touched at the following ports in the order named: St. Thomas, West Indies; Point-a-Pitre, Guadeloupe, West Indies; Basse Terre, Guadeloupe, West Indies; Port Castries, St. Lucia, West Indies; Kingston, St. Vincent, West Indies; Port of Spain, Trinidad; St. George, Grenada, West Indies; La Guayra, Venezuela; Bridgetown, Barbados; Fort de France, Martinique; St. Lucia, West Indies; Bridgetown, Barbados.

During the latter portion of the cruise in the West Indies the threatening aspect of the relations between the United States and Spain changed the itinerary, and the ship joined the South Atlantic Squadron, on its way north, at Barbados, March 2.

After being sent to Fort-de-France, Martinique, for the purpose of docking, and to St. Lucia for a full supply of coal, we rejoined the squadron at Barbados, and later the three ships, *Cincinnati*, *Castine*, and *Wilmington*, crossed the Caribbean Sea to Port Antonio, Jamacia. We then proceeded to Key West, Fla., the latter part of March, and reported to the North Atlantic Squadron, assembling at that point. The necessary changes in anticipation of war were made in the ship, most of the wooden skylights and other incumbrances being landed at Jacksonville, Fla., on completion of which we again joined the fleet at Key West, and at midnight of April 20, started with the fleet for the coast of Cuba. From that moment we were actively employed until the close of the war.

In addition to convoy duty, the *Wilmington* was on the blockade both on the north and south coasts, chiefly in the vicinity of Havana, Matanzas, Cardenas, Manzanillo, Tunas, Jucaro, Santa Cruz del Sur, Cienfuegos, and Isla de Pinos. She entered into two engagements—Cardenas and Manzanillo.

At the battle of Cardenas, May 11, in which this ship, the *Hudson* and the torpedo boat *Winslow* engaged Spanish gunboats and batteries, five were killed and several wounded on the *Winslow*. All were cared for by this ship, close by at the time, until later in the day, when they were transferred to the *Hudson* for transportation to Key West. Among the killed was Ensign Worth Bagley, and among the wounded the commanding officer of the *Winslow*, Lieut. J. B. Bernadou.

At the attack upon and destruction of the Spanish gunboats and transports at Manzanillo, in the early morning of July 18, by the *Wilmington*, *Helena*, *Scorpion*, *Osceola*, *Hist*, *Hornet*, and *Wampatuck*, there were no casualties on our side.

At the close of hostilities we were sent to Hampton Roads, Va., Boston, Mass., Charleston, S. C., and eventually to the Norfolk Navy-Yard to again fit out for the South Atlantic Station.

The general health of the crew has been good during the year; no epidemics. Especial care has been taken in regard to the water used in the tanks. Distilled water only has been used for drinking, and there have been no outbreaks of fever of any importance. The ventilation has been good under ordinary circumstances, but during the war, with skylights and hatches covered, air ports masked, and with but little chance of escape of heated and contaminated air, it was bad. In my last report I mentioned the discomforts arising from the steam steering engine directly under the after wardroom and cabin. This has been markedly alleviated by removing from the quarter-deck a steam winch directly over this region and putting in its place a skylight, allowing escape for heated air, and better circulation.

I stated also in my last report that I had recommended that the gun deck be kept painted and shellacked. This has since been done, with an improvement in the sanitary condition.

The ship, for a river gunboat of such peculiar construction, has done almost continual deep-sea cruising from the time she was commissioned in May, 1897. Her rolling is excessive even under ordinary circumstances. It is remarkable that there have not been injuries more severe than those which have already been received, due to this.

No special changes in the sick bay have been made since my last report. In the dispensary the fresh-water tank, and arrangements in connection with it for dispensing medicines, have for some reason been placed out of commission, the supply pipe having been cut out; so fresh water is now obtained from the sick-bay tank on the other side of the ship.

During the summer we had on board a number of volunteers among the crew, unaccustomed to ship life, and they not only did their work well, but many improved physically, with hardly any sickness among them.

The ship left the Norfolk Navy-Yard December 24, and arrived at San Juan de Porto Rico, en route for the South Atlantic Station, on December 30, and was there at the close of the year.

REPORT ON THE U. S. S. MACHIAS.

By Theodore W. Richards, *Passed Assistant Surgeon, United States Navy.*

After being constantly in commission since September 18, 1894, most of the time cruising on the Asiatic station, the *Machias* reached the United States again early last March, having returned by way of the Suez Canal. Touching first at Norfolk, Va., the ship was soon sent to Boston for a few hurried repairs and an almost complete change in personnel. Leaving Boston early in April, we arrived at Key West on the 15th of that month, and from that time until the latter part of August the ship was in service in Southern waters. Since returning North most of our time has been taken up undergoing extensive repairs, a month being spent at Boston and nearly three months at the Portsmouth Navy-Yard, where the ship has been completely overhauled and practically recommissioned.

During the first quarter of the past year the number of sick was abnormally large (total sick days, five hundred and five), but this is chiefly due to the fact that a number of chronic cases were transferred to this ship to be taken home. A few days after leaving Aden, Arabia, one of the officers developed a very severe case of febris remittens, remaining on the sick list seventy-one days.

During the war the ship was almost constantly engaged in blockade duty on the north coast of Cuba, sailing from Key West with the North Atlantic fleet April 21 to be stationed for nearly a month off the port of Cardenas. Subsequently we were on duty off Havana and Matanzas. Spent about a week in the old Bahama Channel with the squadron under Admiral Sampson's command, and made one trip to the southern coast of Cuba, conveying reenforcements to the troops at Santiago.

Generally speaking, the health of the ship's company was very good during this period. There were a few cases of diarrhœa, occurring chiefly while the ship was at Key West, but all of these were very mild and yielded quickly to treatment. There were several admissions for febris remittens, all but one being of short duration. As the weather was always fine and clear, though hot, the men were usually in the open air, day and night. As the awnings were never spread at sea, officers and men were constantly exposed to the sun, but apparently without ill effect. An endeavor was made to prevent the men from sleeping at night without some sort of shelter, but this was not always successful, especially with the gun crews.

Despite the tedium of blockade duty and the many irksome restrictions incident thereto, the spirits of the men at no time showed any tendency to listlessness or depression, such as might have reacted unfavorably on their physical well-being.

Having no facilities for cold storage, fresh food could seldom be used at sea, our ice supply never lasting more than two or three days after leaving port; while the ship's stores were amply sufficient in quantity and quality at all times, the diet was necessarily monotonous, and the visits of the supply ships were eagerly looked forward to and always highly appreciated by all hands. The fresh meats furnished were always excellent, and added greatly to the comfort and welfare of the vessels supplied.

During the war the *Machias* was in two ports only, Key West and Siboney, Cuba, at the latter port officers and men were engaged for several days in assisting in the disembarkation of troops from the transports under our convoy. Consequently there was some necessary communication with the shore, though restricted as much as possible, and as febris flava was very prevalent in the town at that time there was some danger of infection. Fortunately we had no cases, and so far as known there was no other opportunity for exposure.

Upon leaving Siboney we went to Guantanamo Harbor, where we were strictly quarantined during our stay of two days.

As this vessel was not engaged in action during the war, the number of casualties for the past year has not been unusual.

The general fitness of this ship, from a hygienic and sanitary aspect, having been, doubtless, fully covered in previous reports, I shall only refer to such points as have been brought into especial prominence during recent service, and certain changes which have been completed or contemplated.

VENTILATION.

During the past summer we depended chiefly upon natural ventilation. The blowers were tried occasionally, but little apparent effect could be produced and slight reliance was placed upon the system now installed. Taking advantage of the breeze, which was nearly constant, wind sails were used wherever a hatch was available. The old style with two wings proved most efficient, a "self-trimming" variety being tried for a time and found almost useless. To a certain extent ventilation was interfered with at all times by the battle ports, which were, of course, kept closed, and when, from rain or other causes, the hatches were closed the berth deck became intolerably hot and close.

SICK QUARTERS.

The necessity for a sick bay, at all times apparent enough, was especially so last summer when it was not always possible to transfer patients quickly to hospital, one typhoid case being detained aboard more than three weeks. The dispensary, though quite large enough for its primary purpose, is too small for medical examinations or the simplest surgical cases. Sick call is held in the forward compartment, which is temporarily cleared for that purpose, but there is absolutely no place where patients, though seriously ill, can be given the least isolation or additional air space. The berthing spaces are all fully occupied, and the sick must take their share with the rest. It has been suggested for this and other reasons that a portion of the main deck, just abaft the forecastle, might be inclosed under a light flying deck, thus practically enlarging the forecastle and giving additional space for berthing the crew. There is such a deck at present, but it does not adjoin the forecastle and the space below is not inclosed.

STATION AT GENERAL QUARTERS.

The compartment forward of the wardroom country, now used as the chief petty officers' mess room, is utilized for this purpose, for which it is well adapted. Extending the full width of the ship, it is large, has plenty of light, and is readily accessible. During the war it was lined throughout with wood and had a fore-and-aft wooden bulkhead besides, but this very objectionable condition no longer exists, all the woodwork having been recently removed and the metal thereby exposed covered with cork paint. In this compartment a complete outfit of surgical instruments and supplies was kept at all times, thus avoiding the confusion and delay liable to occur in transporting material from the storeroom and dispensary if suddenly called to quarters, as so frequently occurred at night.

Each of the three gun divisions was supplied with a stretcher and the men were frequently drilled in their use, being also instructed in their duties as "first aids" to the wounded. The stretcher used consisted simply of a board 6 feet long by 1¼ feet broad with three cleats crossing it, one at each end and one in the middle, with three broad straps with heavy buckles to hold the patient in position. Used in the hatchway for which it was designed this simple device answered well, and it seems certain that the injured could have been carefully transferred below as fast as the surgeon's division could attend to them.

RECENT CHANGES IN CONSTRUCTION ABOARD.

The removal of woodwork has been referred to above; so far none of the wood has been removed in the cabin or wardroom.

From the after compartment of the wardroom country a ventilating shaft has been led up through the poop deck. This is a most important improvement, as this part of the ship has hitherto had no outlet for air when the air ports were closed, as they usually are at sea, and the adjoining rooms have been badly ventilated in consequence.

A large additional steam coil has been installed in the wardroom mess room. The necessity for this has been amply demonstrated during the recent cold weather at this port, the original heating apparatus being inadequate in this climate.

REPORT ON THE U. S. S. NASHVILLE,

By F. L. Pleadwell, *Assistant Surgeon, United States Navy.*

On January 1, 1898, the *Nashville* was at the navy-yard, Norfolk, Va., fitting out for a European cruise. Through a change in orders, the ship left Hampton Roads, Va., about January 20, 1898, for Port Royal, S. C., and from this port proceeded to Key West, Fla., where she remained up to the time of the declaration of war, excepting numerous excursions to Dry Tortugas, Fla., and one to Galveston, Tex. On April 23, 1898, the *Nashville*, with others of the blockading fleet, was before Havana, Cuba, and on the same day was assigned to duty off Port Mariel, Cuba. During the remainder of the time of the late war the ship's duty comprised the blockade of Cienfuegos, Cuba; Havana, Cuba, and the occupation and administration of the port of Gibara, Cuba. At the latter place the ship remained for a period of seventy-five days, with one intermission of nine days spent in going to Guantanamo Bay, Cuba, for coal. The ship arrived at the navy-yard, Norfolk, Va., on November 4, 1898, by way of Charleston, S. C., being relieved at Gibara by the U. S. S. *Marietta.*

The general health of the personnel of the ship during the year 1898 has been excellent. The total number of sick days was nine hundred and seven. The only occasion on which precautionary measures became necessary against dangerous infectious disease during the ship's stay in Cuban waters happened upon the occupation of Gibara. The presence of a few cases of yellow fever among Spanish soldiers, and the prevalence of smallpox among the poor of the town, led to the restriction of officers and men to the ship for a period of thirty days, and this restriction was not violated except by officers going ashore on necessary duties, viz, the commanding officer on duties connected with the administration of the town, the paymaster as collector of the port, and the medical officer as health officer of the port.

At the expiration of the first month yellow fever had been absent for several weeks, and officers were allowed shore leave during the afternoon hours, being restricted to certain noninfected portions of the town. Smallpox was prevalent throughout the ship's stay, but chiefly confined to certain well-known districts. Only one serious case of disease attributable to faulty hygiene or climatic conditions occurred among the ship's complement during this time, a case of dysenteria acuta, which was initially a case of diarrhea simplex. A number of cases of the latter disease appeared and were attributed to dietetic conditions—lack of fresh provisions and variety in food.

The only injuries of moment occurring during the year were the gunshot injuries received in the engagement off Cienfuegos, Cuba, only one of which was of a serious nature. A report of these cases and their nature is embodied in the Report of the Surgeon-General, United States Navy, for 1898.

Four cases of hernia were admitted during the year, one being a readmission. One case was transferred to the U. S. S. *Solace* and there operated upon, and three cases were transferred to hospital.

The main sanitary features of the ship were fully reported in the last yearly report, and only changes and improvements will be noted in the present report. The conclusions arrived at and reported in the yearly report of this vessel for 1897, in reference to the behavior of the ship at sea, and the degree of comfort obtainable in her for officers and men, were the result of a short experience, but they are fully borne out and confirmed by the experience of the last year. At sea the ship is remarkably steady, never exceeding 15 degrees as her maximum roll, and it rarely becomes necessary to close gun-deck air ports. In smooth water in harbor the air ports of the berth deck can be kept continuously open. For these latter reasons the ship is well fitted for cruising in the tropics. The most urgent need in the ship at the present time, from a sanitary point of view, is some method of stowing and keeping fresh provisions. In my last yearly report attention was called to this inadequacy of the ship, and its necessity has been represented in letters.

The experience in tropical waters during the last year has served to confirm the opinion formerly held in regard to the necessity for an ice machine and cold-storage room on this ship. With the view of representing this need and recommending its installation, the following letter, addressed to the commanding officer, is self-explanatory:

U. S. S. NASHVILLE,
Navy-Yard, Norfolk, Va., December 19, 1898.

SIR: I respectfully submit the following suggestions and recommendations, having in view the improvement of the sanitary condition of the personnel of the ship and the increased facility in the care and comfort of the sick. During our recent stay in tropical waters, the personnel of this ship suffered the deprivation of fresh provisions and cool water, from a lack of facility for storage of the former and means of cooling the latter. For the crew there is no provision for the storeage and preservation of fresh food, except such as is provided in the usual vegetable lockers on deck, where, in a tropical climate, it soon suffers deterioration; for the cabin and the wardroom two small ice chests are provided on the gun deck, but they are very small and can only hold ice enough for two or three days, which, in a ship otherwise enabled to remain at sea for a long period (*i. e.*, from her large coal-carrying capacity) is entirely inadequate. During the recent cruise in Cuba, where water and provisions from shore could not be obtained, and where, from sanitary reasons, washing could not be sent ashore, the ship's company was restricted, in the first instance, to the use of canned provisions for long periods at a time, and in the second instance to the use of water which, from its temperature, was often unfit for drinking purposes. The latter condition resulted from the rapidity of distillation necessitated by the increased demand, the water not having time to cool before it was delivered into the scuttle butts.

An actual recorded temperature of 102° F. has been observed in the water of the scuttle butt. Under such circumstances, the refreshing and cooling effect of drinking water, so essential in a warm climate, has been wholly unattainable. The latter dificulty may be somewhat modified in the future by recently attained increased storage capacity, but I respectfully submit it as my opinion that this increased capacity will have but little effect in remedying this condition, as the increase only represents about one-fifth of the former total storage capacity. The restriction to canned foods was not always due to an inability to procure fresh provisions, but to the lack of facility for storage and preservation. The use of ice in the treatment of sick, and particularly in the treatment of diseases incident to the tropics, is of great benefit and almost a necessity. I have therefore to respectfully and earnestly recommend that such steps as are necessary be taken to insure the installation of the ice machine originally intended for the ship and to provide a cold-storage room for the storage and preservation of fresh provisions for the personnel.

Very respectfully,
F. L. PLEADWELL,
Assistant Surgeon, United States Navy.

The COMMANDING OFFICER.

There have been but few changes in the ship of importance from a sanitary point of view. The failure of the ventilating system on the starboard side of the sick bay, reported upon in my last yearly report, was found to be due to a defect in the valve, and it has been remedied. With the idea of improving the ventilation of the after fire room, the ventilators leading from the deck have been lengthened, so that when the breeze is dead ahead it is not prevented from entering the ventilators, as has heretofore happened, from the boats placed amidships blocking the mouths of the ventilators. The water-carrying capacity has been increased by 1,780 gallons by changing two sheet chain lockers into water tanks. This makes a total tank capacity of 4,080 gallons, and this can be increased to 10,700 gallons if the forward and after trimming tanks are used for the storage of water.

Since it is advisable for the crew to wear woolen underwear in all climates, it would be of advantage to have on hand for issue, in place of the present heavy blue flannel shirt, one which would be much lighter in texture, for use in the tropics. There is available, for issue to the crew, a white undershirt of mixed goods, but it is possessed of such marked shrinking qualities that it becomes useless after one or two washings, and is no longer issued on board this vessel. Shrinking is less marked in woolen goods when they are dyed.

SPECIAL REPORTS.

REPORT ON THE MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.

By T. C. Walton, *Medical Director, United States Navy.*

I have the honor to submit the following report of the proceedings of the American Public Health Association at its annual meeting for the current year, to which I was accredited a delegate from the United States Navy.

The meeting of the association was held in Ottawa, Canada, September 27 to 30, inclusive. Its general sessions were held in the Parliament building each morning and afternoon. About 150 members were present, and a number of other persons interested in the objects of the association.

The president, Prof. Charles A. Lindsley, of Yale University, delivered the annual address before a large audience in the city hall at a meeting organized for the purpose of giving formal welcome to the association.

Addresses of welcome were made by Hon. Sydney Fisher, minister of agriculture, under whose cognizance the sanitary interests of the Dominion are placed; Sir James Grant, M. D.; the mayor of Ottawa; one of the aldermen, and the chairman of the committee of arrangements, Dr. John Sweetland.

Responses were made by the president and vice-president of the association, and by a representative from Mexico.

The president's address presented in outline the object and aims of the association, and the recent advances in sanitary science.

At the daily sessions the following-titled papers and reports were read, and many of them discussed:

"A history of sewage disposal at the Asylum for the Insane, London, Ontario," by Dr. Bucke, describing a system of intermittent downward filtration through alternate beds and trenches, extended over a large area, where 75,000 gallons of sewage were daily absorbed in about six hours, reappearing as pure water and without pollution to the soil. The filter beds were afterwards used for vegetable gardens, and $200 worth to the acre of vegetables and fruit had been produced.

A paper on the "Disposal of refuse in some European cities," by Thomas McFarlane, F. R. C. S., Ottawa, in which was advocated the exclusion of surface water from the sewage of large cities and the use of the moss-litter system in towns of 30,000 people or less. Moss litter is dried moss, an intermediate between green moss and peat; it has strong absorbent properties for water and ammonia; 1 pound of it will render nonoffensive 8 pounds of excreta.

The most recent methods of "Sewage disposal and their application to certain cities in Ontario," by Mr. Horetzky, C. E.

The "Filtration of sewage," by Captain Van Buskirk, C.

The "Interpretation of the chlorine number in well waters," by Mr. McGill, M. A.

The "Farm well," by Mr. Shutt, M. A., in which was advocated the importance of instructing the rural population in the dangers to health from the use of polluted water and the liabilities to pollution from the proximity of a barnyard. In its discussion a speaker said that the farm well should be at the front of the house instead of at the rear, as was customary.

"An outbreak of typhoid fever due to an infected public water supply," by Dr. Leal, Paterson, N. J.

Report of the committee on the "Cause and prevention of infectious diseases," by Dr. Byrce, Toronto. This report was a model of clearness and conciseness of style and exhaustive comprehensiveness.

"What constitutes an epidemic," by Dr. Lee, the vice-president of the association, in which was advocated that rapidity of spread rather than number of cases should determine epidemicity.

"The urgent need of sanitary education in the public schools," by Mrs. Richards, Boston, Mass.

"Theater sanitation," by Mr. Gerhard, C. E., New York.

Report of the committee on the "Etiology of yellow fever," by Dr. Horlbeck, Charleston, S. C., and a supplementary report by Dr. Liceago, of the City of Mexico; also a short paper on "Yellow fever," by the same writer. In this connection a committee was reorganized to wait on the President of the United States for the purpose of obtaining the appointment of a bacteriological commission to go to Havana to investigate the causes and prevention of yellow fever.

Report of the committee on the "Causes and prevention of infant mortality," by Dr. Wende, Buffalo, N. Y.

"Some observations from practical experience with bovine tuberculosis in New Hampshire," by Dr. Watson, secretary New Hampshire Board of Health, in which it was claimed that the dangers from infection from that disease had been much overrated, and that the disease could be controlled if not eradicated by sanitary measures.

"A convenient method of staining tubercle bacilli," by Dr. de Schweinitz, Washington, D. C.

"Compulsory vaccination ought to be imposed as a paramount necessity," by Dr. Septien, Mexico.

Report of the committee on "Demography and statistics in their sanitary relations," by Dr. Wilbur, Lansing, Mich. The committee recommended and the association adopted resolutions to provide a plan for the establishment of vital statistics officers in nonregistration States, to be incorporated in the act providing for the taking of the next United States census; also for the general adoption of the Bertillon system of the classification of diseases and for an international alliance between the registrars of the countries embraced in this association and those of other countries using the Bertillon system and that may hereafter use it. A committee was appointed to carry out these purposes.

"The administration of the adulteration act in Canada," by Dr. Valade, Ottawa, Canada.

"Ought we to reopen the leper asylums?" by Dr. Ramirez, Mexico.

"Leprosy in Minnesota and the Northwest," by Dr. Bracken, Minneapolis, Minn. In the discussion Dr. Ramirez stated that in his opinion leprosy is not hereditary; that measures were necessary to prevent contagion; the most effective is isolation. In the greater part of

South America leprosy has practically disappeared. In the United States there are a few small foci; such are found in Louisiana, Texas, California, Minnesota, and Oregon; that the recent annexation of the Sandwich Islands places the nation in an especial condition to at once undertake measures of defense against that immense focus of leprosy. It was advocated that the General Government establish a retreat for the segregation of lepers and provide for their care.

Report of the committee on "Sanitation, with special reference to drainage, plumbing, and ventilation of public and private buildings," by Mr. Hughes, of Montreal. The intercepting trap on private sewers was condemned; it not only modified the speed and partly obstructed the flow of sewage, but it prevented any of the air carried down by the soil and other waste-water pipes from discharging into the street sewer where it was necessary to aid in the purification of the sewage and in preventing the generation of sewer gases. Mr. Hughes said that he had observed that in houses without the intercepting trap in their sewer pipes there was freedom from odors and diseases traceable to sewer-gas poisoning, and such was not the case in those where the trap was installed, as in many of modern construction. Dr. Durgin, of Boston, stated that illuminating gas from leaking gas fittings was more dangerous to health than sewer gas; that during the last five years 169 deaths had occurred in Boston caused by the former and that there were innumerable cases of slow poisoning from it. An inspection of 153 houses of all classes had found 137 with defective gas fittings, with from two to eleven leaks. The leaks were all from imperfect connections.

"Notes on the etiology of typhus fever," by Dr. Brena, of Mexico.

Report of the committee on "Railway car ventilation," by Professor Woodbridge, of Boston, Mass. The Pennsylvania Railway system of ventilating cars by drawing air from the outside, passing it over steam radiators, then introducing it into the car under the seats and allowing the bad air to escape through openings in the roof was commended; also a somewhat similar plan adopted by the "Big Four Railway" system; in the latter the bad air is drawn out near the floor through ducts between the windows, while pure air is introduced from outside by ducts with filters at the ends of the cars, the air being warmed by its passage over steam pipes.

"Diseases of the skin and hairy scalp which are commonly transmitted by contagion at schools: Ways of preventing it," by Dr. Mendezaba, Mexico.

Report of the committee on "Disinfection and disinfectants," by Professor Robinson, Brunswick, Me.

"Methods of testing disinfectants and methods of using disinfectants in cities, in hospitals, and in quarantine work," by several members.

"The diptera from a hygienic point of view," by Dr. Ramirez, Mexico.

"The spread of typhoid and dysenteric diseases by flies," by Dr. Veeder, Lyons, N. Y.

"An epidemic of diphtheria traced to an infected milk supply," by Dr. Lee, Philadelphia.

"Preventive antirabic inoculation service in Mexico," by Dr. Liceago, Mexico.

Report of some of the most important papers presented at the fourth congress of tuberculosis, in Paris, 1898, by Dr. de Schweinitz Washington, D. C.

"The sanitary treatment of inebriates," by Dr. Rosebrugh, Toronto, Ont.

"Garbage reduction by steam," by Dr. Veeder, Lyons, N. Y., and Mr. Richards, Elizabeth, N. J.

Reports of committees: On transportation of diseased tissues by mail; some method of international arrangement for protection against the transmission of infectious diseases; on animal diseases and on animal food; on the duties and responsibilities of the healthy man for his own and others' health, and on public legislation.

At the closing session the usual resolutions of thanks were adopted for many courtesies received from the Dominion Government, especially from the minister of agriculture; the mayor, aldermen, and citizens of Ottawa; the chairman of the committee of arrangements, Dr. John Sweetland, and his associates; the ladies of Ottawa; the proprietor of the Russell House; the railroad officials, and members of the press.

The newly elected president of the association, Dr. George H. Rohé, of Baltimore, was escorted to the chair by the two senior ex-presidents, Dr. Gihon, U. S. N., and Dr. Durgin, of Boston.

After addresses by the president-elect and the retiring president, the association adjourned to meet at Minneapolis, Minn., in November, 1899.

REPORT ON BASSINI'S OPERATION FOR THE RADICAL CURE OF HERNIA.

By Medical Director GEORGE W. WOODS, *United States Navy.*

Ever since my association with the United States Navy, and especially in my connection with its hospital practice, I have been impressed with the necessity of an operation which should be a radical cure for hernia, it being the opprobrium of both the Army and Navy medical service, that so many enlisted men of both the Army and Navy are discharged with this disability without any attempt at cure, due to the fact that men declined operation, which they are permitted to do, because their attending surgeon could not promise them a cure, believing firmly himself that no operation could be performed which would insure perfect ability to perform duty, and this has been the history of most cases in my operative experience of an earlier date, in which the operations of Wood and Wützer were the rule, which I early instituted in hospitals under my charge.

But with the introduction of the operation of Bassini a different result has been attained, and it would now seem that we have a reliable operation, as free from danger as any that could be instituted, in the majority of cases really a radical cure, and presenting every probability of the enlisted man being returned to duty in a sound condition, capable of performing hard work involving strain without danger of recurrence of the hernia.

The reasons for performing this operation may be thus enumerated, and the advantages attained are:

1. For the physical betterment of the individual.
2. The saving of a life pension to the Government.
3. The retention in the service of valuable men and men desirous of continuing in the Navy and Marine Corps.
4. Under proper technique the small percentage of recurrences (less than 1 per cent) and trifling danger as regards life, in these

otherwise fine physical specimens, almost demand the operation as a duty.

5. The repeated drill in aseptic technique and its repeated accomplishment inspires confidence in hesitating surgeons, and will broaden the field of operative work generally.

6. The probability of strangulation is made very remote.

During the first quarter of 1898 these cases were submitted to operation with perfect results, save in one case, in which atrophy of testicle occurred, due to acute epididymitis, and in a second, a congenital one, there was great difficulty in separating sac from cord, due to inflammatory adhesions. A fourth case of incomplete indirect inguinal hernia, easily reducible, was operated on in the third quarter of same year, and was completely successful, primary union of incisions occurring on the fifth day.

The remaining cases were operated on soon after the occurrence of the rupture in most instances, and were well fitted for the radical cure on that account. In some the hernias were little more than bubonoceles, and the intestine had not been extruded more than two or three times before operation. In some of these cases no sac could be demonstrated after careful searching.

OPERATIVE TECHNIQUE AND HISTORY OF CASES.

Usual preparation of dressings, patient, hands, instruments, etc., for aseptic work.

The wounds were kept as free from blood as possible, by clamping vessels, before they were cut. Some modification of Bassini's method was practiced. One or more sutures were introduced above the cord in the deep line.

The cord and sac were separated, the latter opened, tied off high up, cut off, and the stump put back into the abdomen. When no sac could be demonstrated, the component parts of the cord were identified and no tissue resembling the sac was seen. The conjoining tendon and Poupart's ligament were brought together with interrupted sutures of heavy chromicized catgut, one or two sutures placed above the cord, as noted above. The divided aponeurosis of the external oblique muscle was united over the cord with a continuous line of chromicized catgut sutures, and the skin edges adjusted with plain catgut. No irrigation was employed. The wounds were wiped out with warm normal salt solution.

Catharsis was induced on the third day. The patients were kept in bed for three weeks.

Case 1.—R. P. B., landsman, aged 28. Right oblique inguinal hernia which had been down but twice before operation. Said to have occurred, as a result of lifting, three months before operation. General physique excellent. Operation, April 19, 1899. Anesthetic, ether, from which the patient reacted well. No sac was found after a painstaking search. Postoperative condition, normal. Wounds united by first intention. Patient under observation until June 2, 1899, when he was sent to duty, cured.

Case 2.—A. A., ordinary seaman, aged 49. Left incomplete reducible inguinal hernia. Said to have followed a strain, induced by slipping on deck while carrying a heavy weight, about seven weeks before operation. General condition good. Operation, May 19, 1899. Anesthetic, ether, from which patient reacted well. Sac present and removed. Postoperative condition, normal; wound united by first intention. Patient under observation until August 5, 1899, when he was sent to duty, cured.

Cases 3 and 4.—J. B. L., master-at-arms, first-class, aged 35. Double bubonocele. The hernias were said to have been first noticed after injuries received in the *Maine* explosion, fourteen months prior to operation. General condition good. Double operation May 19, 1899. Anesthetic, ether, from which the patient reacted well. The aponeurosis of the external oblique muscle on each side was extremely thin, and the transversalis fascia on each side was bulging forward. No sac could be demonstrated on either side. Post-operative condition normal. Wounds united by first intention. Patient was sent to duty, cured, on July 11, 1899.

Case 5.—C. H. G., chief machinist, aged 35. Left oblique inguinal hernia, reducible. Said to have been first noticed after two days of "trying work on the feed pumps." General condition fair. Operation June 15, 1899. Anesthetic, ether, from which the patient reacted well. A dense sac was removed. Post-operative condition normal. Wounds united by first intention. Patient still in hospital under observation. Result perfect. To be sent to duty shortly.

Cases 6 and 7.—J. S., cockswain, aged 28. Reducible oblique inguinal hernia, both sides. Right hernia said to have resulted from exertion on a boat davit, eighteen months before operation, and the left appeared one month before. Both have been continuously retained with trusses. General condition excellent. Double operation July 27, 1899. Anesthetic, ether, from which the patient reacted well. No sac demonstrated on either side. Post-operative condition normal. Wounds united by first intention. Still under observation. Result perfect.

NOTES ON THE HEALTH AND SANITARY CONDITIONS OF HAWAII AND THE PHILIPPINES.

By JOHN C. WISE, *Medical Inspector, United States Navy.*

Inasmuch as these countries are to assume such close relations with the United States, it is well that we should be informed as to their conditions of disease and health.

The general health of Hawaii is excellent, as shown by the following figures giving death rate in Honolulu for nine months ending December 31, 1894:

	Annual death rate per 1,000.	Estimated population.
All nationalities	21.14	28,000
Hawaiians	31.19	10,500
Asiatics	15.89	9,500
Portuguese	14.21	3,800
All others	16.66	4,200

The total for all nationalities is about that for our American cities. The total of European nationalities, with Americans, is about that of Newport, R. I.

That prevailing syphilis is largely imported is clearly shown by the statistics published under the act to mitigate.

LEPROSY.

Owing to the high death rate, low birth rate, and the great prevalence of abortion among the Hawaiians, the race numbers now but about 30,000. The disease rarely attacks the white races (5 cases were reported in Honolulu in two years). Such being the fact, this disease is rapidly losing the importance hitherto attached to it. The alarm incident to the great increase of patients at Molokai is not due to an increase in leprosy in Hawaii, but at Molokai, where the number December 1, 1897, was 1,100. The act to segregate lepers under the government of the republic was stringently enforced. House-to-house visitations were made; armed posses arrested all those who lived as mountain bands. Furthermore, the sentiment and attitude of the natives has greatly increased in favor of the humane aspects of Molokai. There is little concealment by families and more self-surrender. Furthermore, cases in their incipiency are now segregated, and under improved hygienic conditions alone their lives are prolonged, and this diminished death rate swells the number of inmates.

If in the great number of years past, during which an extensive commerce has prevailed between these islands and the States, when in the former the native population has been so much greater than at present, when active segregation has separated the leprous from the community at large, it would seem that the danger to the United States from leprous introduction is at a minimum. There is no known case of Hawaiian leprosy in the States, while many cases of Chinese leprosy have been imported into California.

In closing this subject we will add that the matters of sewerage and deficient water are receiving ample attention by the excellent board of health at Honolulu.

Coming now to a brief consideration of the Philippines, it can be premised that the health problem here is far worse than in the Hawaiian group. In the latter the health is conserved by an almost constant trade wind. In the former the prevalence for months of the southwest monsoon means a high sick rate, and at all times malarial and other fevers, with digestive diseases. When foreigners preserve their health in these islands after prolonged residence, it is the exception. Men from temperate latitudes lose strength and stamina here after a residence of six months. From the 15th of November until February, when the polar current prevails, the climate favors us with many delightful days of sunshine and weather equal to the Riviera; but the moist southern wind brings great heat and physical depression, to be followed by the dry season or "period of evaporation," the most dangerous of the year.

A strict quarantine has kept out bubonic plague. Cholera is not common. Beriberi, on the other hand, abounds, and the Spanish navy had to maintain special wards for its treatment. Smallpox, as in all Eastern countries, abounds. Syphilitic and venereal diseases prevail, especially among native women. Consumption, as in all islands of the Pacific becoming civilized, is a dread destroyer. The disease once implanted, finds a favored habitat in a race who have changed their simple attire for European dress and who have a diet deficient in nitrogenous and fatty food.

Leaving out of consideration the pacification of these islands, the question of greatest moment to our people is that of health. If sanitation is looked to the health will greatly improve; yet there are two factors of disease which will remain, viz, the sickly southwest monsoon, and the importation of epidemic disease from Asiatic ports. As matters are at present, diseases of the digestive tract and fevers are most to be dreaded.

Apropos of naming fevers after localities, so much deplored by Aitken, we may mention the so-called black-water or hæmaturic fever of central Africa. The necessity for experts who can give their time to investigation is greatly felt. Thus the English secretary for the colonies, in conjunction with the royal society, has instituted a commission to study tropical malaria; especially is it intended for medical men named by the colonial or foreign office for service in the tropics. It is trusted that our own Government will take similar action, and endeavor to place the manifold conditions known as tropical fevers in a clearer light, by sending to the Philippines men of known ability, who can devote themselves to this study.

The Tagalos, a race which lives on the coast and near foreign towns, have suffered most, as we would naturally expect, from introduced disease; the tribes of the north, who are barbarous, are far healthier.

It is known that there are many points in the islands where a comparatively cool temperature and much greater salubrity exists. They are usually localities on the Pacific side (east), where the southwest monsoon discharges much of its moisture and is cooled in the mountain ranges, which extend the whole length of Luzon.

It is believed that the construction of Manila is such that it can never be made a healthy town. Sewers as at present constructed do not withstand the frequent seismic agitation, and besides, the sewage is carried into the Pasig River and not into the bay.

Speaking for the Navy, certainly great praise is due the sanitary authorities, commanding and medical, who so carefully guarded all avenues of disease and kept the sick rate at such a phenomenally low rate before the occupation of Manila.

Such statistics of disease and meteorology as could be obtained are given below:

METEOROLOGY.

From observations for the decade between 1870–1880 the mean annual temperature was 82; the maximum was 97, and occurred in September; the minimum, 55, occurred in February.

The meteorological means as observed on this ship for May, June, and July, 1898, were as follows:

Month.	Thermometer.			Barometer, height.
	Maximum-	Minimum.	Mean.	
May	90.05	84.1	83.9	29.96
June	90.02	82.5	86.1	29.90
July	89.00	82.1	85.4	29.95

The rainfall is very heavy, amounting in the entire year to about 120 inches.

DEMOGRAPHY.

The estimated population of Manila is 300,000, composed as follows:

	Per cent.
Pure native	67.00
Chinese	13.30
Chinese half-castes	16.65
Spanish and Creole	1.65
Spanish half-caste	1.30
Foreigners	.10

The following figures for Manila are fairly accurate:

Births in Manila during October and November.

OCTOBER.

Race.	Legitimate.	Illegitimate.	Total.
Spanish	22		22
Mestizo and Indian	387	137	524
Grand total of births			546
Grand total of deaths			502

NOVEMBER.

Race.	Legitimate.	Illegitimate.	Total.
Spanish	18	3	21
Mestizo and Indian	361	152	513
Grand total of births			534
Grand total of deaths			605

The census of 1876 places increase in population of colony at 2 per cent per annum, which is gratifying, compared to the decline in so many of the Pacific groups. There is little doubt but that infantile mortality can be greatly diminished if better care is inculcated.

The Spanish naval hospital at Canacao was in use on our arrival on May 1, and for a few days longer until the patients were transferred to Manila. It was quite large and apparently complete in its appointments, but it suffered from many disadvantages. Its site is low, and it is surrounded by low land and a sluggish river passes very near. It is but two miles from the navy-yard, and was quite exposed to native molestation until they were driven out in February, by which time everything had been carried away that was portable and much of the standing structure had been broken up.

If it is found desirable to build a larger and better equipped hospital for the Navy, a more suitable site should be selected at an elevation where relatively cool and bracing air can be had. This may be found at the top of Corregidor Island, or probably more satisfactorily a few miles in the interior, where a beautiful hilly country is of easy access and where it is said numerous hot springs abound.

The construction of the hospital was much delayed by the outbreak of hostilities early in February. The native workmen all left the yard, and it was weeks before a force of Chinese sufficient to carry on the work satisfactorily was obtained.

The administrative building has a fine separate entrance, with a well-built stairs and broad halls on each floor.

REPORT ON THE NAVAL HOSPITAL, CAVITE, PHILIPPINE ISLANDS.

By R. C. PERSONS, *Medical Inspector, United States Navy.*

The hospital at the naval station at Cavite, Philippine Islands, which was opened for the reception of patients on March 27, 1899, is situated in the lower part of the navy-yard, between storehouses and near the machine shops, with an unoccupied area in front, the rear portion being within a few feet of Canacao Bay. It is placed favorably so that it is swept by the northeast and southwest monsoons, which find ready entrance through its large open windows and doors. The buildings were not designed for hospital purposes, but were converted for temporary use, and while the ward is of ample size to contain the sick of the squadron and a small marine guard, it will prove inadequate in case of an epidemic or a large increase of marines. It can only be regarded as a temporary hospital on account of locality. It is amply furnished and fitted with all appliances for the care of the sick, but the growing needs of the yard will soon demand its removal, while the interests of the hospital will demand a change to a locality with larger grounds for the necessary increase in size and number of its buildings. In the state of war existing at the time the hospital was decided on it was deemed unsafe to life and property to partially reconstruct and rehabilitate the buildings of the much larger naval hospital used by the Spaniards, situated at Canacao, two miles from the navy-yard. The situation of that hospital, while probably the best within so short a distance from the yard, is bad in some respects, which will be spoken of in a subsequent report.

The buildings now in use consist of a small 2-story house situated at right angles to and between the rear ends of two large 2-story storehouses, with an open space between the front portions, this space opening on an unbuilt portion of the yard where there are a few trees standing. Facing the center building, it is the upper story of the storehouse on the left which has been converted into a ward, and communication has been established between it and the hallway of the second story of the smaller building by means of double doors, the floor under the ward being used as a storehouse for yard purposes. At the back of these buildings, and about 30 feet away, is a sea wall, 4 feet high, surmounted by an iron fence, the space between it and the buildings being a passage-way. The roof of each building is of corrugated iron, painted red. The smaller building has 2 built up, slatted ventilators at the apex of the roof, and the larger one 5, which are quite necessary in this climate for the escape of hot air.

The smaller building is two rooms deep, divided by a longitudinal narrow passage, and contains on the lower floor, storerooms, dining room, pharmacist's mess room, laundry, and bathroom, and a small annex for kitchen purposes. The upper floor contains an office, dispensary, operating room, pharmacist's and apprentices' bedrooms and four rooms for sick officers, divided by a hall running the length of the building and opening into the ward. Access to this hall from the ground floor is gained by a wide central staircase with a landing halfway up, dividing there into two stairways, to the right and left.

On the right as this building is entered is the medical storeroom, containing shelves around two sides, and pyramid shelves in the center, which afford abundant room to store the supplies. The upper part of the partition walls of this room and of all of the lower floor and some on the upper floor are slatted for the better circulation of air, and the floor of this story is of cement, in most places badly laid, as the dampness strikes through, and at the highest tides the dampness is sufficient to be wiped off. On the left is a room of similar size with three closets, one designed for the food stores for daily use, the other two being used for storing bags and hammocks, though designed as cells for refractory patients. The main portion of this room is intended as a sleeping room for the civil employees, who are at present Filipinos and Chinese. Across the passage from the storeroom at the back, and of almost equal dimensions, is the dining room for patients, fitted with tables and stools, and a large glass-inclosed sideboard for tableware. Two large windows admit light and air. The adjoining room contains the laundry tubs and table, and an ice box, and is the passageway to the kitchen. After the laundry is the pharmacist's mess room, which is small and is fitted with an extension table, chairs, and sideboard; and next comes the bathroom, with its large masonry tub, tile lined, with cold-water pipes and shower arrangement. Cold water is also piped to the laundry tubs and kitchen sink, and drains lead from all to the sea, through the wall. The ceiling of the lower story is about 12 feet high.

In the upper story and in front, beginning next the ward, is the dispensary. This connects with ward, hall, and pharmacist's bedroom by doors. It is about 19½ feet long by 13½ feet wide, and the ceiling is about 11 feet above the floor. In the ceiling is a hatch about 2 feet square, opening into the attic, for upward draft through the slatted ventilators, and an opening of the same size is in the ceiling of all the rooms on this story. Two large windows make the front of the room very open. A plain arrangement of shelves and drawers at one end for medicines, and at the other two closed wardrobe-like cases, one with glass doors for instruments, the other with solid doors for record books and papers, a typewriter desk and tables, and a sink, make up the furnishing.

A corresponding room of nearly equal size at the other end of the building is for a sick officer. It contains 2,581 cubic feet of air space, is fitted with a Manila bed, table, marble-top washstand, mirror, a long bamboo reclining chair, bent-wood upright, and rocking-chair, and bedside rug. A bureau and wardrobe are to be supplied.

The two middle rooms, of nearly the same size, containing 2,000 and 2,300 feet of air space, are used as bedrooms for the pharmacist and apprentices. They open in front on a small balcony, through windows reaching the floor, and into the hall. The balcony has slatted blinds which open and close. The same furnishing exists as in the room for sick officers.

Across the hall on the rear side in the center is the general office for the medical officers. This contains 2,783 cubic feet of space, and is fitted with two roller-top oak desks, bookcase, table, and chairs. Two large windows open on the water, and two doors into the hall. Sick officers' rooms are on each side of the office, containing 1,876 and 1,642 cubic feet, and are fitted as the one above described. At the far end of the hall is a small room through which access is gained to the water-closet, hanging over the water, by means of a covered way. This room is also used as an officer's ward when the other three are occupied. It contains 1,092 cubic feet, and is too small to be fitted with the same furniture as the others, but contains sufficient for comfort. The operating room is next to the patients' ward. It contains 2,815 cubic feet of air space. Three tiers of shelves for appliances and irrigating jars are at one end, and a shelf for irrigating jars at the other, with a stationary marble-top washstand piped for cold water, and waste-water sink, leading to waste pipes below. Between the windows are glass-top tables, while the enameled operating table is in the center.

In the hall adjacent to the operating room and ward is a handsome set of bookcase shelves made of a richly colored red and yellow grained hard wood of native growth, with sliding glass doors above and closed compartments below. The shelves contain over 500 bound volumes, and there are more than 1,000 unbound volumes, and, being selected books, contribute much to the comfort of the patients. At the other end of the hall is a large linen closet made of similar wood.

The patients' ward is 118 feet long, 38 feet wide, about 11 feet to the eaves, whence the roof leads upward at a moderate angle to the apex, along which are five slatted ventilators. There is no ceiling. The contained air space is about 65,841 cubic feet.

At the front end of the ward is a large double door, with a window at either side. The door was placed for storehouse purposes and has no steps. The eastern side of the ward looks upon an area, contains seven windows and a door, the latter leading to a small porch with outside uncovered steps leading from the ground. The rear end of the ward opens on a large veranda covered with corrugated iron, the sides being open, through a door with a window on each side. The situation of the ward is most favorable for the free blowing through of the wind. The ward is provided with beds of the Manila design, arranged along the sides. Should occasion require, more than double the number of beds can be placed down the center without overcrowding. At present cots are used for additional patients. The ward is fitted with straight and long reclining bamboo chairs, tables, and a row of plants down the center, the largest table being for reading and writing purposes, and is supplied with contributed newspapers, books, and stationery.

The large recently constructed veranda, spoken of as at the rear of the ward, is of equal width as the ward and extends out over the water. A short distance above the floor and on either side of the door are two moderate-size water tanks for supplying water to the buildings. Pipes lead from the roof to them, and in the wet season the rain keeps them filled. In the dry season they are filled by water boat from the works in Manila. Alongside of one of the tanks and screened off is a porcelain-lined iron tub for use of the patients, piped for cold water and drained. Over the water, beyond the sea wall, is the water-closest. The veranda is supplied with chairs, easy and straight, and is the favorite reading and lounging place for patients out of bed, as it is open to all breezes. Under the porch on the ground are three iron water tanks surrounded by masonry. The hospital at present is lighted by lamps, there being no electric-light plant in the yard. A distilling plant should be erected and steam led into the kitchen for cooking purposes, but the steam plant of the yard has not yet been enlarged. An addition to the kitchen will be built when the new Duparquet range shall arrive.

In the rear of the hospital a furnace has been built for the purposes of boiling drinking water and of boiling clothes. The supply of water for drinking purposes is obtained from rain or from the Manila waterworks, and in both cases is boiled. Both the boiling and laundry coppers hold nearly 100 gallons, which is ample for present needs.

NOTES.

The ground on which the navy-yard and Cavite is situated is low, being only a few inches above the highest tides, and is generally level; consequently there are no springs. Water can be obtained by digging a couple of feet, but is brackish. It is influenced by the state of the tide, sometimes approaching very near the surface. The excess of rain water is led off by masonry conduits. There are no hollow spaces for water to collect, and as the soil is porous the water readily disappears after a rain in the dry season, but in the wet the soil becomes saturated. The yard is wind swept the greater part of the year and the direct rays of the sun at some time of the day strike most of the ground not built on. There are no surface indications of malaria, and the location should be a healthful one, especially in the dry season. In the wet season the sun's rays are veiled by clouds and the rainfall is great, and not many roofs will stand the typhoons without more or less leakage; the ground is saturated and walls, furniture, and clothes become damp, and mold is everywhere and of rapid growth, and will easily spoil all classes of fiber and leather unless constantly attended to, and the dampness is so penetrating when the air is constantly saturated that surgical instruments are bound to be affected, even with constant care.

The Manila beds spoken of above are of hardwood framework, the posts being high and supporting a canopy for mosquito bars. The bottom of the bed is made of cane in the open work pattern so familiar in cane-work chairs at home, and over this is placed a closely-woven straw mat. Mattresses and sheets are not used as a rule, but a closely woven mosquito net is essential to rest or sleep, for mosquitoes are plentiful and vicious at all seasons. The net either falls on the floor or is tucked under the mat. If it falls to the floor a mat is not necessary, as the circulation of air is better. While it is easy to become accustomed to these hard beds, and they are more comfortable for a well person and one who only passes the nights in one, patients who are in bed all the time need a mattress and sheets. Blankets are seldom needed unless a patient is very much reduced, but a light covering is necessary at times, and more would be required were it not that the mosquito net obstructs the air. The day as well as the night dress of the patients is a suit of pajamas, and they go in these to their meals as well. Slippers are also furnished. Thicker clothing is uncomfortable, even when not moving about.

The ward is also supplied with a copper bath tub on wheels for the purpose of giving bedside baths, and has proven invaluable in the treatment of fever cases, the escape of heat being very slow from a fevered patient into an atmosphere of high temperature saturated with moisture, but escapes rapidly into cooled water.

The Cavite market furnishes very few articles, and those only in fruit and vegetables, and high in price. This state of things is likely to last until some time after the hostilities have ceased. Bananas of an inferior quality are abundant, and in season very fine mangos are to be had, while of vegetables, cabbage, squash, an inferior eggplant, and lettuce and radishes are to be obtained.

Groceries can be bought in Manila, but much the best and lower-priced are bought from the army commissary. Ice, fresh beef, and mutton are obtained from the Government supply ships. Prices of all articles in Manila have been much advanced since the opening of the war.

REPORT ON CASES OF POISONING BY WOOD ALCOHOL.

By THOMAS H. STREETS, *Medical Inspector, United States Navy.*

On account of the number of deaths which have occurred among the enlisted force of the Navy from drinking methylated spirits, and to add to the scanty knowledge which exists of the effect of this poison on the human system, I make this detailed report of the two cases which recently occurred on board this vessel. I give all the facts which I have been able to obtain in regard to them.

M. O., a private marine, aged 31 years and 4 months, and R. C., a private marine, aged 28 years, drank a liquid from a bottle labeled "alcohol," with fatal results to both. To explain the long delay in its action, I was particular in collecting the following facts: O., being a man with a good conduct record, frequently went on liberty; while C., whose conduct record was bad, had not been on liberty since previous to August 10. O. went ashore September 9 and returned September 10. On his return at 8 a. m. he was posted C. and S., and continued on duty, such duty being two hours on and eight hours off post, until 1 p. m. of the 12th, when he was again given liberty and went to Vallejo. It is supposed that O. brought with him, on the 10th, the alcohol of which the two drank. On the testimony of another marine, who broke the bottle and spilled what was left of its contents to prevent them from drinking more of it, I have come to the conclusion that it must have been drunk previous to 6 a. m. of the 12th. C.'s statement was to the same effect, namely, that he drank it on the night of the 11th. Neither in O. nor in C. were any of the usual signs of intoxication observed while they were on board the vessel. They went through the drills and did their usual work without attracting attention from their officers, although some of their companions in the ranks noticed that there was something out of the ordinary with O. It was ascertained from the witness mentioned above, that the alcohol was brought aboard in two 8 ounce bottles, one of which was emptied, and the other was half emptied when broken. They, therefore, probably drank about 12 ounces of the poison.

As I have before stated, O. went on liberty at 1 p. m. of the 12th. About 3 a. m. of the 13th he was arrested in Vallejo for causing a disturbance in a drinking saloon, and was handcuffed and lodged in a cell in the police station. At 10 a. m. of the same day, when they went to the cell to bring him forth, he was found to be dead. There were slight marks of external violence about the body, but none of them, nor all together, were sufficient to have caused death. They were nothing more than abrasions. An autopsy, made in the afternoon of the 13th, by Assistant Surgeon William L. Bell, United States Navy, showed the cause of death to have been a hemorrhage into the third ventricle of the brain. The clot was very fibrous or stringy. All the internal organs of the body showed extreme congestion.

Private C. continued about his duties until 11.30 a. m., of the 13th, when he was obliged to desist by reason of blindness and severe pain in the head. He could see the hand when held before the face, but could not determine the number of fingers extended. There was some gastric irritation, as evinced by nausea. When questioned, he complained of pains in chest and head, principally the former. The temperature was 98.3. It was taken per rectum several times before death, and at no time did the thermometer read more than 99.6. There was a hebetude which he shook off with an apparent effort when spoken to, and answered the question rationally. Once while answering an inquiry, he paused, then said to himself, "It's gone!" evidently alluding to the sequence of his thoughts. His statements in regard to the time when he drank the liquor and who drank with him were afterwards verified.

The pupils were widely dilated, but not to the same extent as I have seen them in other cases of poisoning by the same substance. As soon as I observed this symptom and the blindness, I was sure we had to deal with a case of poisoning by wood alcohol, although there is no other evidence that it was such. The patient was immediately removed to the hospital at Mare Island. At 5 p. m. the pulse was 110, respirations 35; at 7.30 p. m., pulse 48, respirations 26; at 7.45 p.m., pulse 56, respirations 24. Death took place about five minutes later. There was no loss of motion, and he retained consciousness until near the end. Respiration first stopped, and then the heart ceased to beat. Death was preceded by two convulsive spasms, with a slight tendency to opisthotonos with the last.

An autopsy was held the following morning. The head and neck were purple from engorgement of the vessels. The brain was the only internal organ examined. All the vessels were tense with blood. There was a patch of adhesion, about the size of a dime piece, on the edge of the longitudinal fissure, near the fissure of Rolando. There was no effusion of blood into the cavities nor into the substance of the brain.

REPORT ON THE PROCEEDINGS OF THE INTERNATIONAL MEDICAL CONGRESS ON TUBERCULOSIS.

By J. C. BOYD, *Surgeon, United States Navy.*

The International Medical Congress on Tuberculosis, which convened in Berlin, Germany, during the month of May last, brought together a large assemblage of laymen and professional men, whose deliberations attracted not only the attention of the medical world, but were regarded with the deepest interest by humanitarians, philanthropists, and by all others who recognized in the character of the addresses and discussions of the congress, the necessity on the part of the profession for adopting more systematic efforts and improved methods, based upon scientific principles, for the treatment of tuberculosis, with special reference to the consideration of ways and means that were deemed most desirable for putting into practical operation the establishment of sanatoriums for the care and treatment of patients suffering from the incipient symptoms of tubercular infection. Representatives were present as delegates from the principal foreign governments, and while their presence was a prominent feature in the organization of the congress, they constituted a very small proportion of the great body of the convention, which was composed of the most eminent physicians, hygienists, sanitarians, and bacteriologists, who were present as the representatives of every province and district of the German-speaking countries. In addition to this large aggregation of professional men, it embraced in its membership a number of distinguished scholars who were recognized the world over as authorities in the several departments of learning and to which they had dedicated their lives for the advancement of science. Delegates were also present in their representative capacities from the German municipalities, orders, unions, insurance companies, etc., and through these incorporated associations all branches of trade in the German empire were included. The congress was, in fact, a noteworthy gathering of representative men, who were controlled by a unity of purpose in contributing their knowledge and in concentrating their united efforts for advancing by their deliberations and devising after discussion and mature consideration the most appropriate measures for combatting and arresting the progress of this international disease.

The congress, moreover, was conspicuous for the foresight and wisdom exhibited by those in charge of its organization and management, in opening wide the doors for membership, so as to render eligible for participation in its discussions all persons who felt an interest in developing and helping forward the great work for which the congress was convened.

Before attempting to outline the work of the congress, it might be a matter of no little interest to indicate briefly a few of the leading incidents which determined and controlled the committee in issuing, under Governmental supervision, their circular, announcing the objects and purposes for which the proposed congress was called, and in which all preliminary arrangements relating to the order of business and presentation and discussion of papers embraced under the several sections of the congress, were clearly presented and accurately defined. The officials in charge of the preliminary arrangements of the congress demonstrated thoroughly their fitness for the duties which had been assigned them, and to Dr. Gotwold Pannwitz, the secretary-general of the congress, too much credit can not be given for the high order of executive ability exhibited by him in his untiring and indefatigable efforts to make the work of the congress a complete success.

On February 26, 1899, the German Government, through its ambassador at this capital, informed the Secretary of State that the German central committee for the erection of hospitals for persons with diseased lungs had resolved to convoke a congress for the purpose of discussing and deliberating upon practical measures for the prevention and cure of tuberculosis as an endemic disease, said congress to be international in character and to be held at Berlin, Germany, from May 24 to 27, 1899. The German ambassador, in transmitting the communication from his Government, stated that the congress would be held under the patronage of Her Imperial Majesty the Empress, and the chancellor of the Empire, Prince Hohenlohe von Schillingsfürst, would act as its honorary president. It was furthermore the intention of the committee that the sessions of the congress should be held in the building occupied by the Reichstag, and the object of the congress would be to advance our present knowledge and facilitate efforts for the prevention, arrest, and cure of tuberculosis, to place said efforts in the right channels by the discussion of their proper scientific basis, and to bring about the greatest harmony possible in carrying out and putting into operation the most suitable measures for limiting the spread of the disease. Inasmuch as efforts to stamp out tuberculosis were now being made in other countries as well as in Germany, it was assumed and believed that foreign nations generally would be deeply interested in the work of the congress. The German ambassador further stated in submitting his request that he had been instructed by his Government to inform that of the United States that it would be gratified if the United States Government should see fit to send official delegates to take part in the deliberations of the congress.

Under date of March 4, 1899, the Department of State transmitted to the honorable Secretary of the Navy a copy of the above communication from the German ambassador, and in forwarding it inclosed for the Department's information the programme of the proposed meeting, giving full and detailed particulars of the organization and scope of the congress.

In pursuance of the above request, and acting upon this invitation so cordially extended by the German Government, and moreover, realizing the importance to the medical profession and to the public at large of the good results likely to follow from the deliberations of this great international gathering of medical and scientific men, the Navy Department informed the German ambassador, through the Department of State, that a delegate would be ordered at the proper time to attend the congress, and, on behalf of this Government, to represent the medical department of the Navy.

The German central committee (in the circular accompanying the invitation) stated that it would be the endeavor of the congress to bring before the public as widely as possible tuberculosis as a national disease, its dangers, and the methods of combating it, and in doing this, the knowledge of the nature of the disease and of its dissemination, and the means and ways now at our disposal for its effectual prevention and treatment, and especially the importance of establishing sanitoriums, would be emphasized and utilized. But the main object in convoking the congress, as stated by the committee, was for the purpose of setting forth as briefly and as accurately as possible what, at the present time, may be regarded as well ascertained in the theory and practice of this disease, and where these facts have not been determined, what can at least be so far gained by discussion that a practical decision as to its treatment may be arrived at.

It was well understood, however, in assembling the congress that all decisions upon the adoption of practical measures for the treatment of this disease must be arrived at by the general direction or trend of the discussions and by a preponderance of the views as expressed by the members of the congress. In their circular announcing the proposed Congress a general invitation was extended by the committee to all persons who felt an interest in the prevention of tuberculosis as a national disease.

The several governments of the small German States, municipalities, faculties, medical boards, orders, unions, insurance companies, sanitarium unions, and other corporations interested in the prevention of consumption were notified of the holding of the congress and requested to send delegates as members. Foreign governments were likewise notified of the meeting of the congress.

The subjects were discussed in their order on the days of meeting. Messrs. Köhler and Krieger undertook the preparation of the special treatises for section 1; Messrs. Robert Koch and B. Fränkel for section 2; Messrs. Gerhardt and Schjerning for section 3; Messrs. von Ziemssen and von Schroetter for section 4, and Messrs. Gaebel and Dettweiler for section 5.

The congress assembled in the Reichstag (Parliamentary building) at 10 o'clock Wednesday morning, May 24, 1899, and was opened with elaborate ceremonies, and in the presence of Her Majesty the Empress, who occupied a seat in the gallery reserved for members of the royal family. This large assemblage of more than 2,000 professional men, collected as they were from all parts of the civilized world, was an impressive and brilliant scene, and the deep interest and earnest attention manifested by them in the proceedings of the congress showed clearly a determination on their part to utilize every legitimate method for inaugurating and establishing the most practical measures for combating the spread of tuberculosis.

When the Empress entered the hall, attended by Prince Hohenlohe von Schillingsfürst, and escorted to the imperial box by von dem Knesebeck, chairman of the central committee of the Red Cross, the entire audience arose, and the secretary of state, Dr. (Count) von Posadowsky, delivered an address of welcome. In addressing the congress, Dr. von Posadowsky spoke of the great success that had been achieved by the technical sciences, and to accomplish this work of civilization, said the speaker, mighty workshops have been established in which the raw material has been molded into objects for human use. These technical advances, achieved by the most arduous mental and physical labor, have averted manifold dangers and conquered many ancient foes of our existence that in former centuries caused the sacrifice of numerous human lives. With the progress of human civilization, resulting in beneficent effects on the one hand, new dangers confront us on the other, which have arisen from the newly developed state of affairs. The crowding of human beings, caused by modern industrial life and activity, as well as by the necessary technical appliances of some of our industrial enterprises, has awakened new phases of disease that in part bear the stamp of vocation diseases. Even tuberculosis, for the purpose of combating which this congress is assembled, is, in its present extent as an endemic disease, the companion of modern civilized life, and presents a growing menace to the commonweal, which, according to the speaker, is likely to cause serious solicitude among governments, the medical profession, among students of political economy, and among all friends of humanity.

It is the determination of this congress, Dr. Posadowsky stated, to discuss measures and mature plans for combating this evil systematically, and to call upon a noble and self-sacrificing race to assist in the attainment of this object. It was this feeling that induced two German sovereigns and their exalted allies to call into existence the present national legislation on the subject in Germany, and indefatigably have they fostered it with paternal care. Guided by lofty motives, Her Majesty the Empress graciously assumed a protectorate over the present congress, and in this she has been ably assisted by the best people of our land, who have actively interested themselves in its welfare. The fact that we see before us to-day representatives of nearly all the civilized nations of the earth is a striking proof that in the endeavor to promote the well-being of the sick, the feeble, and the unfortunate all civilized nations were a unit. The speaker, in closing his address remarked that, while a conference of statesmen is at this time in session at the Hague for the purpose of devising ways and means for avoiding and modifying the horrors of war, another conference of medical authorities and sincere philanthropists from all the ends of the earth has assembled under the sympathetic patronage of the German Emperor and his exalted wife at the capital of the German Empire, to determine what steps shall be taken to check and prevent the spreading of a disease that destroys the vitality and working strength of all nations. These two events, he said, will be recorded as memorable on the pages of the history of our civilization, and will serve as a standard by which to judge the spirit of our times. He expressed the fervent hope that the intelligent deliberations of this congress may be followed everywhere by effective action and noble deeds, and that this meeting may be the beginning of a great international work having the same ultimate object in view.

Upon the completion of his address, Count von Posadowsky introduced the Duke von Ratibor and Professor von Leyden, as president and vice-president, respectively, of the congress. The president, on taking the chair, expressed his thanks to the members of the congress for the great honor conferred upon him in having been selected to preside over their deliberations, and, in closing his address, thanked all governments and authorities everywhere for the interest taken in the congress.

Telegrams were read by the president from the crowned heads of Continental Europe, the Queen of England, the President of the United States, and the President of the French Republic, all of them extending their congratulations to the congress upon its proposed work, and expressing a deep interest in the beneficent results likely to follow from its deliberations and actions.

In submitting this paper on the proceedings of the congress, I have found it necessary, owing to the immense quantity of the material at the disposal of the committee for the information of the members, to present simply an abstract of the leading features brought out in the reports, and to refer to discussions on such reports only when the information contained in them is deemed essential to supplement the statements advanced in the general propositions.

SECTION I.

THE DISSEMINATION (SPREADING) OF TUBERCULOSIS.

[Section presided over by Dr. Köhler, of Berlin, and Dr. Krieger, of Strassburg.]

Dr. Köhler addressed the congress on the spreading and significance of tuberculosis as an endemic, with the statement that it might appear superfluous to enter into detail on the subject of the significance and extent of tuberculosis were it not for the fact that we can not too deeply and too earnestly consider the dissemination of the disease throughout the human race. The statistics supposed to show the extent of tuberculosis are very inaccurate, and this is particularly applicable to the enumeration of new cases, which, as a rule, do not become known until the disease is in an advanced stage, demanding hospital treatment. The mortuary statistics show that frequently the immediate cause of death is given, even in cases where it should be regarded merely as a disease accompanying or following in the course of tuberculosis. He regarded the tuberculosis statistics of childhood as the least accurate. However, the material on hand suffices to enable us to declare with certainty that tuberculosis is, among infectious diseases, the one that causes the most deplorable loss of health and demands the greatest number of victims. The disease occurs in all parts of the world—in the torrid as well as the temperate zones—and all races are subject to and succumb to its influences.

Dr. Köhler said that the mean of mortality in the German Empire from pulmonary tuberculosis is annually 2.25, and from all of the above-mentioned diseases of the respiratory organs together 4.9, per 1,000 of inhabitants. The total mortality from 1894 to 1897 averaged 21.8.

Whether the elevation above the level of the sea is greater or less, in comparing whole countries, does not seem to affect the extent of tuberculosis in any considerable degree; and even in comparing subdivisions of the German Empire a very much lower rate of mortality is not recorded in mountainous portions of the country.

So far as meteorological conditions, such as rains, temperature, the force and kinds of winds, electro-magnetic currents, etc., are concerned as factors, he was unable to produce statistical information relating to large areas, but during the first five months of the year the rate of mortality is the highest in the northern countries of the temperate zone.

The mortality from pulmonary consumption is generally greater among males than among females, and in Germany it increases in importance as man advances in years. Estimated from the number of the living, the mortality is greatest between the ages of 60 and 70, but if a comparison is drawn among those of different ages, so as to take into consideration the significance of tuberculosis in proportion to the total number of those dying at different ages, then the greatest proportionate number of deaths occurs from consumption between the ages of 20 and 30.

The average number of deaths for the four years from 1894 to 1897, between the ages of 50 and 60, in the German Empire amounted annually to 87,600 from pulmonary tuberculosis, i. e., 2.95 out of every 1,000 persons between those ages, in a total death rate of 9.1.

From an economic and sanitary point of view, the appearance of consumption at the age when a person is able to earn his livelihood is of the greatest importance, because every death at this age and every case of serious illness means diminution of the working capital represented by the masses.

A close examination of existing statistics shows that the conditions which man creates for himself are far more important than those with which nature provides him.

In concluding his remarks, Dr. Köhler referred to the danger from tuberculosis which threatens all, but he did not regard the struggle with this disease as hopeless. This is demonstrated by the fact that in such of the civilized countries as have inaugurated the fight the rate of mortality is being gradually reduced. It becomes a duty, therefore, to employ every weapon that has proved of avail against the disease, and also to use every resource by which the power of resistance of the human body may may be increased.

Dr. Krieger, of Strassburg, followed Dr. Köhler with a paper on the connection between the spreading of tuberculosis and people's surroundings and modes of living. He pointed out that a person's immediate surroundings and manner of living contribute to the spreading of tuberculosis in two ways—by creating a source of infection, and also by rendering the body particularly receptive to the exciting cause of the disease. These influences are of a manifold variety and are often closely connected; and in estimating the significance of a single contributing cause it becomes as necessary as it is difficult to separate or isolate it from concurrent contributing influences. Accurate comparative statistics, said Dr. Krieger, would serve our purpose best, but the task being one difficult of execution and one that would fail of success in consequence of faulty methods, the compiling of such statistics has not been productive of much good. An investigation into the environment of men's lives, which embrace a large number of noxious influences, discloses to us, it is true, their effect in the aggregate upon the spreading of the disease, but fails to enlighten us as to the exact effect of each of these noxious influences separately, and this is possible only by exclusion in cases where the value of the other factors is precisely known.

Dr. Krieger referred to the difficulty experienced in isolating and determining the precise effect of single injurious factors, which, he said, is responsible for the failure to ascertain by means of statistics the significance of important hygienic factors, as, for instance, the mode of nutrition, the condition of dwellings, etc., as bearing upon the extent of pulmonary tuberculosis. Bacteriological examinations and medical observations have shown, however, that to be shut in with consumptives with bacillary expectorations greatly influences the spread of tuberculosis. Disinfection of the sputa and thorough cleanliness of the rooms are the things to be seen to in such cases.

In examining the climatic influences Dr. Krieger said that we encountered the difficulty that other influences concurrent with the climate are either not known or can only with difficulty be eliminated. The seasons have a powerful effect on the mortality of consumptives; and this fact is well authenticated, but whether they affect the origin or spreading of tuberculosis has not been shown.

Vocation doubtless exerts a great influence on the spreading of tuberculosis, and with reference to this matter the speaker said that special attention should be directed to—

(*a*) Vocations that render infection highly probable, such as the nursing of the sick.

(*b*) Vocations that induce catarrh and obstructions in the bronchioles, or are likely to lead to injuries. Such vocations create places of receptivity and lodgment for the bacillus, and among them are such as fill the lungs with ordinary dust or with particles of sharp-edged or corroding dust.

(*c*) Vocations which require such positions of the body during work as to prevent the upper lobes of the lungs from being properly inflated. This, of course, results in diminished air and blood circulation in those parts, and consequent local susceptibility.

(*d*) Vocations requiring sedentary mode of life, little muscular activity and exercise in the open air, thus resulting in enfeeblement of the system, especially of the heart, and causing a general decrease of the powers of the body to resist disease. In some vocations the harmful influences referred to above exist in conjunction.

Director Gebhardt, of Lübeck, referred to the spreading of tuberculosis among the insured population, with the statement that those compelled to insure numbered about 12,850,000, and that the total number of both the insured and those dependent upon the insured would probably amount to 25,000,000. Statistics are deficient, but it may be stated that from 1892 to 1895 there were, among 151,000 cases of disability, 16,800, or 11 per cent, that had tuberculosis. He stated that it had been ascertained that among all male operatives up to the age of 30 more than one-half of all invalids are sufferers from consumption. According to Director Gebhardt, Hamburg is the only place in which it has been attempted to compile statistics showing the rate of diseases and deaths as compared with the income of each individual. Figures show that of persons with an income of over 2,000 marks ($500) a year, 15 die of tuberculosis out of every 10,000, while of those whose incomes are less than 2,000 marks, at least 40 so succumb. The latter, so far as they are laboring people, are of the insurance class; hence those companies are greatly interested in combating tuberculosis.

Director Gebhardt stated that it was as much a demand of sociopolitical legislation of the German Empire, which provides for the care of the sick, as it was one of solicitude for the general public health, that institutions should be established and carried on by the aid of public subsidies, if necessary, in which the disease can be successfully combated, and all of those affected with it and who have no means of their own can receive the treatment requisite to overcome their suffering.

Surgeon-General Dr. Schjerning, of Berlin, read a paper before the congress on tuberculosis in the army, in which he stated that the measures which had been taken in the German army to prevent and reduce the number of cases of tuberculosis was based upon the discovery of the tubercle bacillus by Koch, as well as upon the investigations and practical conclusions resulting from this discovery. He referred especially to the general care bestowed upon the nutrition and attention to the bodily hygiene of the troops, their suitable dressing, lodging, etc., especially referring to proper administration of the recruiting service, to well-defined hygienic arrangements and careful therapeutics in the treatment of the sick.

In the German army, since 1882, there was at first a uniformity in the percentage of sick from tuberculosis; this was followed in 1890–1892 by a slight increase in the percentage of sick, materially conditioned by the prevalence of epidemic influenza during those years. Since that period, however, in spite of the increase in the army, there has been a decreasing mortality from tuberculosis; and the last year has recorded the lowest number of cases of illness from this disease, which may be regarded as an especially good sign, and showing, further, that the recruits are selected with much greater care.

The frequency in the occurrence of tuberculosis in the army, as stated by Dr. Schjerning, can be absolutely regarded as a test of the character and value of the recruiting service.

The lowest numbers of men affected with tuberculosis in the German army were shown by those army corps whose provincial population was most exempted from tuberculosis. The highest numbers are found in the Tenth, Third, Sixteenth, Sixth, Eleventh, and Fourteenth army corps, and the population from which these corps were recruited showed a corresponding increase from this disease.

The mode of life in great cities is of much influence in determining the frequency of the occurrence of tuberculosis in the different garrisons.

The rates of mortality in the army have steadily fallen from 0.63 per 1,000 in 1882–83 to 0.24 per 1,000 in 1897–98. But this result can only be regarded as a proof that we have now succeeded in the early recognition of tubercular infection, and granting leave to those ill with the disease, or if necessary discharging them, which is best for the sick, as well as preserving the efficiency of the army.

The troops of the line (infantry, cavalry, artillery, engineers) have a high general disease rate, but a small number of cases of consumption. In all the troops whose services restrict them to indoor life (such as artificers, musicians, military bakers, and others) the proportion is reversed.

The period of entering the service has something to do with the number of those suffering from tuberculosis, and most cases occur during the first year. The men who have passed the age of 22 before entering the army are most prone to the disease; then come those entering under the age of 20, but as a matter of fact the age of 20 is the most favorable time for entering the service in order to escape tuberculosis. Of all the men who developed tuberculosis, 29 per cent had consumptive relatives. One-half of all those affected had shown symptoms of the disease prior to reporting for service, which symptoms could be accounted for as soon as the tubercular taint became established, and the disease was probably latent when they entered the army. This demonstrates the great importance of having army surgeons, before accepting recruits, procure a complete history in all cases where the tubercular taint is suspected, or rather in all cases where the general health is not up to the standard.

Dr. Schjerning states that in the German army a census or tally card is kept of every consumptive soldier, and that there are at this time 6,924 of these cards on which the statistics relating to consumption in the army are based.

In conclusion, the Doctor remarked that the time will come, he is convinced, when a thorough knowledge of the nature of tuberculosis will class it among the avoidable diseases; that the German army will become the great State institution in which the disease will disappear first, thus verifying the prediction of Dr. von Coler, chief surgeon of the general staff, in his eloquent address at Moscow, "that the sons of the German people that are intrusted to the army will be discharged at the close of their term of service free from disease, with vigorous and rugged constitutions, trained in a military spirit, healthy in body and soul, and in returning to their homes will be able to rear sound and happy families."

Professor Bollinger, of Munich, director-general of the health bureau, referred to tuberculosis among the domestic animals, and to what extent it influences the spreading of the disease among men. He stated that the prevalence of tuberculosis among cattle and hogs, which is according to its origin identical with human tuberculosis, and the enormous extent and frightful increase, principally in cattle, is not only an inveterate evil threatening the cattle raisers and farmers, but a constant danger to human health. Human tuberculosis as a source of tuberculosis of domestic animals plays a subordinate part.

The infectious character of the meat of tubercular animals increases with the stages of the disease and the degree of their diseased condition. There is indeed imminent danger of man's being infected by such meat, but the fact of such infection has not been shown to be frequent. The danger from this source can be guarded against by thoroughly preparing the meat and avoiding the use of it in a raw or half-raw condition. According to Professor Bollinger, the greatest danger to human beings is in the use of milk and unsterilized milk from tubercular cows. Where tuberculosis has become general, or has its seat in the udder, the milk is infectious. It may, however, be of the same character where tuberculosis is only a local affection. The use of the milk of diseased cows is especially detrimental to children and to adults susceptible of infection, if it is consumed in large quantities, unscalded, and if its use is continued. To judge of the danger threatening man from the use of the milk of infected cows, he stated that one need only observe the frequency of tuberculosis in hogs, which is induced by feeding the latter with infected milk.

The extent to which tubercular affections exist among children, especially where the disease is localized in the lymphatic glands, is traceable directly to infected cows' milk.

Professor Bollinger believed that the first step toward the effective removal of the danger which threatens the human family from infection carried by domestic animals is a legal enactment compelling the inspection of meats. Such legislation will be hailed with approbation as an effective prophylactic against tuberculosis.

Dr. Andrew Voigt, of Frankfort, spoke on the relation which statistics bore to the number of cases and the number of deaths from tuberculosis, in which he remarked that the tuberculosis records kept by sick-fund societies are deficient and faulty and useless as a basis on which to calculate the relative significance of this disease among different nations and among the different vocations pursued by people everywhere. He states that figures expressing cases of sickness and fatalities should always be classed according to age and sex, and it is essentially necessary that the number of consumptives and deaths from consumption should be compared with the number of the living of every age and sex, and not with the total number of those that have died from all diseases combined.

Dr. Kuthy, of Budapest, discussed the extent of tuberculosis in Hungary, stating that the mortality due to this disease is proportionately large in Hungary, there being 60,000 deaths annually, and about 400,000 affected with consumption at all times. Referring to the proportion of deaths from consumption as compared with deaths from other infectious diseases, the showing is about the same as that made by other countries. He stated that in the cities the disease is much more prevalent than in the rural districts, and that the eastern and northern parts of Hungary (that is the mountainous sections) are much freer from the disease than the other parts. The reason for this, aside from the favorable climatic conditions in the northern and eastern belts, is due largely to the fact that the population in those parts is not nearly so dense.

Dr. Schmid, of Berne, Switzerland, director of the Swiss board of health, spoke upon the extent of tuberculosis in Switzerland. He emphasized the necessity of compiling statistics upon correct principles as the only standard by which to judge tuberculosis as an endemic disease, and said that such statistics must show the number of deaths from tuberculosis in proportion to the total number of deaths as returned or not returned by physicians. Dr. Schmid observed that during the past twenty years there had been a slight reduction in the mortality from pulmonary tuberculosis in Switzerland. But, at the same time, the number of deaths from tuberculosis affecting other organs had increased in an inverse ratio. Such increase, he believed, was partly due to the progress made in diagnosing tubercular affections. He stated that tuberculosis prevailed more extensively in the industrial centers than in the agricultural districts, which was due to the density of the population of the former, and that under analogous social conditions the mortality from consumption decreases as the better environment increases.

Dr. Brauer, of Heidelberg, spoke on the extent of tuberculosis among the workmen in tobacco factories, stating that clinical and statistical records show that a relatively large proportion of the workmen in tobacco factories suffer from tuberculosis, and that the herding together of large masses of workmen in these factories offered good opportunity for the transmission of the tubercle bacilli. As a majority of the consumptives expectorated on the floor, the latter becomes laden with bacilli, and, in the form of dust, is readily inhaled. He further stated that where workmen sat close to and opposite to each other at their work, small particles of expectorated sputa containing the bacilli are inhaled.

Dr. Meyer, of Berlin, discussed the occurrence of tuberculosis among the printers and binders in Berlin, and referred to the fact that, while in recent years there had been a gradual lowering in the death rate from consumption both at home and abroad, statistics show that this condition did not hold in the case of printers and compositors, in which there was no decrease in the rate of mortality.

These results have been ascertained through the lists of the sick kept by the local insurance bureau for the printers' trade from January, 1893, to April, 1899. In the total number of years covered by the report the records show that the number of deaths from consumption and other diseases of the respiratory organs is always the greatest from the twenty-first to the fortieth year. Printers who have once suffered from any lesion of the respiratory organs are very apt to be again attacked, as is shown by the considerable number of cases in which the patients had recurring attacks of the same disease, or perhaps of a new disease involving the same organs.

Dr. Stratmann, of Solingen, referred to tuberculosis among grinders of steel instruments, and showed from official statistics that in 1895 of all persons dying between the ages of 50 and 60 in Rhenish Prussia, 39.1 per cent succumbed to tuberculosis, and, as computed by districts, the figures show Solingen to be at the head of the list, with 47.7 per cent. The average age of the grinders was 35 years, and with few exceptions they suffered with tuberculosis of the respiratory organs, and in the majority of cases the right lung was affected.

The Doctor states as among the chief causes for the development of tuberculosis among the grinders the following:

(*a*) The inhaling of dust from grindstones, also from materials used in grinding, among which Vienna polishing chalk is the most dangerous and feared by the grinders on account of its drying up the mucosa of the respiratory tract.

(*b*) The want of sufficient change of air in the lungs. The grinders generally bend over forward, close to their grindstones, and in this posture the diaphragm and liver are crowded deep into the chest, and the lungs from the position of the body are constantly compressed and prevented from expanding.

(*c*) The use of spirits to excess, which is very prevalent among grinders and polishers.

(*d*) Heredity.

The Doctor believed that the danger to health from this disease among the grinders can be very much lessened by improving the mode of living—that is, better dwellings, better food, and better hygienic surroundings, in the following manner:

(*a*) By improving the conditions prevailing in grinding rooms, by providing greater cleanliness and better ventilation.

(*b*) By interdicting the use of spirits in the workshops during the working hours.

(*c*) By carefully selecting proper subjects for apprentices.

(*d*) By dissuading grinders from early marriages.

(*e*) By constantly and properly instructing the men and boys in regard to their trade, the dangers connected therewith, and the best means of averting them.

SECTION II.

ETIOLOGY OF TUBERCULOSIS.

[Section presided over by Dr. R. Koch and Dr. B. Fränkel, both of Berlin.]

Dr. Flügge, of Breslau, gave a historical synopsis of the subject of the development of the doctrine or theory regarding the exciting cause of tuberculosis. He showed clearly how Koch succeeded in finding as the exciting cause of the disease certain bacilli that are endowed with peculiar cultural and morphological attributes. In the present light of the matter it is no longer subject to any doubt that the tubercle bacillus is the only immediate cause of all the different phases of human tuberculosis, and that this bacillus is likewise the exciting cause of murrain in cattle.

It has been cited, the Doctor remarked, as one objection to Koch's theory, that the sputa of consumptives does not always contain tubercle bacilli. This objection is not, however, valid, and is removed by the experience that the tubercle bacilli die very fast outside of the body. It is different with the second objection—that acid-proof bacilli are found also in organs that are not tubercular—but these acid-proof bacilli are not identical with tubercle bacilli, and it is not difficult to distinguish them by their biological and tinctorial peculiarities. The closest resemblance to the human tubercle bacilli may be found in those that excite tuberculosis among fowls, but their identity has not been established.

The real tubercle bacilli are "obligated" parasites, that is, parasites, that do not thrive outside of the human body. In artificial culture soil they do develop, but often undergo morphological changes. They also lose their virulence outside of the human organism. There are, therefore, all sorts of tubercle bacilli that are not virulent and have no power to infect. Many other pathological micro-organisms show similar variations, and so do certain plants of a higher order. Sometimes these too lose their peculiar attributes in part, and there may be in the same species different varieties that materially differ from each other. We have never yet been able to change bacilli that resemble tubercle bacilli into the real article, nor has it been possible to make cultures with the real tubercle bacillus outside of the human body in such a way as to have it retain its virulence. The tubercle bacilli, according to Dr. Flügge, are obligated parasites that can live only in the human or animal organism.

Prof. C. Fränkel, of Halle, spoke of the manner in which tuberculosis is communicated. Twenty years, he said, have not yet elapsed since the discovery of Koch, and of course it has not in so short a time been possible to solve the entire problem of the propagation and spreading of the disease. The immediate past, however, has dispelled many scientific doubts and corrected many errors. As regards the most important features of the subject, the questions involved in the manner in which the disease is imparted have been answered. The invasion of the body by the bacilli is to be looked upon as the signal for a battle between two hostile powers. Arrayed on the one side is the body in its protective armor of natural power of resistance; on the other are its adversaries, minute and waging constant guerrilla warfare. Outside of the human or animal organism the tubercle bacillus does not thrive. The source of infection is therefore solely in the organism. The meat and milk of murrainous cattle, the excreta of tubercular skins or mucosa, and, above all, the expectorations of consumptives bring the exciters of the disease into man's immediate neighborhood. Notwithstanding all this, said the speaker, laymen should not indulge in excessive fear nor feel discouraged, for the sick are a menace to the healthy only when the tubercular focus is in uninterrupted connection with outer surroundings. This, for example, is not the case in peritoneal tuberculosis, in meningeal tuberculosis, and not even in pulmonary tuberculosis as long as the disease is in its incipiency—in the so-called "closed" condition, i. e., when there has been no breaking through into the delicate ramifications of the bronchi. As long as consumptives breathe quietly the air around them is free from bacilli. Not until the contents of cavities are evacuated by fits of coughing do the tubercle bacilli get into the air in the form of most delicate drops and bubbles and settle in this way in large numbers on articles of consistency, like handkerchiefs, spittoons, floors, walls, etc.

Outside of the body the bacteria soon go to ruin, decomposition of their elements destroying their chance of life in from six to seven weeks, and their virulence ceases in less time. By drying out, the bacilli perish in from six to ten months. Sunlight destroys the bacilli rapidly, and they occur only in the immediate vicinity of the sick to whom they cling, and the supposed ubiquity of the bacilli no longer exists, as has been shown by Cornet. Flügge and his disciples, according to Dr. Fränkel, have gathered proofs of the transmission of bacilli by means of the minute drops coughed up and scattered by the patient. Still, in this way they could scarcely get more than a meter or a meter and a half from the sick person, so that at an increased distance the danger decreases. The risk, too, of conveying the tubercle bacilli by means of dishes, clothing, insects soiled with phthisical excreta, etc., is a comparatively small one, as only infinitesimal quantities of tubercular infection are carried in this way.

Professor Pfeiffer, of Berlin, lectured on the mixed infection of pulmonary tuberculosis, in which he said that it had already been demonstrated by Koch that, in conjunction with the tubercle bacilli, other disease germs are active, and are generally found on the outside of the sputa. These secondary bacteria reach the lungs generally through the nose and adjacent respiratory passages, in which they always exist. Without such mixed infection tuberculosis often progresses without fever, the latter depending upon mixed infection. While streptococci have rarely been found in the blood of consumptives during fever periods, it is assumed that the fever is caused by the poisonous products of the changes induced by the presence of the streptococci. As these tubercular patients suffering from mixed infection constitute an element of danger to those having tuberculosis in an uncomplicated form, Professor Pfeiffer considered it always advisable to separate in the curative resorts the patients from those that are free from fever.

Privy Councilor Professor Löffler, of Greifswald, in presenting his views and those of other physicians, based on experience with human beings as well as tests with animals, regarding the questions of heredity, immunity, and temperament, remarked that congenital tuberculosis is extremely rare, and where such cases have occurred the mother was found to be tainted with general tuberculosis and her organs of generation were involved. A tubercular condition of the father is not a factor in hereditary transmission.

Whether some persons possess immunity from consumption, whether congenital or acquired, has not been shown, nor has it been demonstrated whether there is such a thing as congenital or inherited tendency to consumption. But there is strong ground for assuming that other diseased conditions, especially of the respiratory tract or digestive organs, as well as disturbances in nutrition or malnutrition, favor a development of the disease, and that persons of delicate physique living under unfavorable conditions are in special danger.

The discussions under this section were participated in by a number of speakers, and among them Dr. Hesse, of Dresden, referred to a new procedure in making cultures of tubercle bacilli, which consisted chiefly in the employment of a "nahr-agar-agars," to which is added, instead of the customary peptone, a quantity of "nutrin heyden." This latter substance is soluble albumen, which in its attributes resembles both coagulated albumen and somatose and is between the two. In this nutritious soil the tubercle bacilli multiply two and three times as rapidly as in the best solid soil heretofore used. This fact is of value in the culture of bacilli taken from tuberculosis excreta.

Dr. Birch-Hirschfeld, of Breslau, spoke on the first stage of pulmonary consumption, in which he stated, as a result of a close examination of a number of cases of persons who had been accidentally killed, that incipient pulmonary consumption did not begin from an inflammatory condition of the minute ramifications of the respiratory tract, but he found the primary seat of the disease to be in the bronchial tubes of the second, third, fourth, or fifth class. This explains why the apices of the lungs are attacked by preference, as the bronchials distributed through them are incapable on account of their peculiar situation to remove mechanical obstructions which have found their way into them.

Dr. Brieger, of Breslau, spoke on hyperplasia of the tonsils, in which he stated that it was wrong to attach too much importance to the hyperplasia of the tonsils as indicative of the probable development of a general tubercular condition. Latent tuberculosis of the tonsils is of etiological significance chiefly when neighboring parts, such as the middle ear and the lymphatic glands, are involved; but so far as the lungs are concerned, it need not be seriously considered unless there appears to be a tendency to infection through the lymphatic glands.

Staff Surgeon Dr. von Zander, of Berlin, discussed the etiological statistics relating to tuberculosis, and stated that in 312 cases of tuberculosis which had come under his observation between January and April, 1899, and which were not picked cases, but cases representing largely lung diseases in various phases, there were 116 which were probably caused by infection.

Messrs. Lannelongue and Achard, of Paris, spoke on the association of injuries with tuberculosis, and stated that it scarcely ever had been shown that in tubercular subjects a serious injury, such as fracture or luxation, had become the starting point for a bacillary focus, and from their observation it appears that in this disease there exists, in contrast with what occurs in any other infections, a want of harmony between experimentation and clinical experience.

The experiments of Max Schüller, which were embraced in a series of valuable publications, were made partly with human products, more or less pure, partly with cultures of microbes, which were erroneously considered the exciting cause of tuberculosis, and whose microorganism was unknown.

Messrs. Lannelongue and Achard began a series of experiments inoculating guinea pigs in the different parts of their bodies; in the cellular tissue, peritoneum, trachea, and blood, with cultures of the human bacillus of tubercular products. They then inflicted injuries upon the guinea pigs such as contusions and fractures at various stages of the infection. The animals died of tuberculosis, but without presenting tubercular lesions at the points of injury. The experiments were then repeated on rabbits by injecting pure cultures of the human bacillus, but in most cases the results were just as unsuccessful. These cultures not having demonstrated any virulence, they were injected into the products of human infection and in a number of cases tubercular arthritis was obtained, but only after inoculation with large quantities and injecting the morbid products into the blood, at the same time producing an injury. In all cases the conditions in which they succeeded by experiments in localizing the tubercular process by means of inflicting injuries were very different from those prevailing in human clinical experience, and so great as to bring out a marked contrast.

In summing up the results of their experience in this matter, they did not believe that it was an easy matter to localize in a traumatic focus the tubercular process, which is explained by the scarcity of blood infection in tubercular animals and the rapidity with which rejected bacilli disappear from the blood.

Messrs. Arloing and Courmont, of Lyons, in a paper presented before the congress, stated that in order to obtain agglutination of Koch's bacillus homogeneous culture liquids must first be obtained. Daily shaking of the cultures will bring about this result, and the cultures are employed from eight to twelve days. They stated that the most agglutinated serums are those of dogs or of cattle inoculated with nonvirulent serum. They agglutinate sometimes at $\frac{1}{1300}$ and $\frac{1}{1600}$, and in this way standard serums are gotten. Tests with human serum were made in 186 cases, and of these 106 were tubercular patients at the clinics, and all of them responded to the test except 10, who had cavities and fever and were seriously affected. Their investigations show that the less aggravated a case is the more successful is agglutination, but the more advanced the disease is, the less manifest is the reaction, exactly as it is with tuberculin. Among 60 presumably healthy men they ascertained that 34 had only one negative reaction and 26 responded, showing that there were 43 per cent of the cases in which individuals apparently healthy had concealed tuberculosis. These figures, they remarked, prove very conclusively the results obtained from the tuberculin test. In recapitulating the results of their researches they stated that the agglutination test is harmless, and is an excellent means of diagnosing latent tuberculosis, but it must be remembered that the reaction may not occur in advanced cases when the diagnosis is otherwise easy. The only difficulty is the necessity of keeping on hand constantly homogeneous cultures ready for agglutination. But they believe that this and other difficulties will undoubtedly be in time overcome and the mode of procedure will grow far beyond its present narrow limits.

SECTION III.

PROPHYLAXIS IN TUBERCULOSIS.

[Section presided over by Dr. Gerhardt and Dr. Schjerning, both of Berlin.]

Dr. Roth, of Potsdam, a member of the health bureau, spoke on the precautions that should be observed in guarding against tubercular infection and the proper measures to this end that should be taken by the sanitary officials. He regarded it as most important to prevent the inhalation of moist or dry tubercular expectoration in the form of dust, which could be accomplished by removing the expectorated matter and avoiding the minute particles of moist matter that may be thrown out in coughing, sneezing, etc. Neglected statistics showed an increase of tuberculosis. He insisted upon the necessity of educating the people so that they might properly understand the incipient symptoms of phthisis, and the rules to be followed during the progress of the disease. In all establishments where any considerable number of people live or work or assemble together, those affected with tuberculosis should be immediately isolated, and referred to the importance of reporting all such cases as soon as discovered.

Privy Councilor Professor Dr. Heubner, of Berlin, who spoke on the prevention of tuberculosis in childhood, prefaced his remarks with the statement that tubercular disease is almost always acquired and not transmitted, and supported this proposition by stating that among 800 children examined in his clinic he found no germs in those less than three months old, but found that 26 per cent of those nearly a year old were affected with tuberculosis. In the majority of cases that develop in later years, he was convinced that the disease had been acquired in childhood, and almost exclusively by infection, generally by inhalation, rarely through food and drink.

Privy Councilor Professor Dr. Kirchner spoke on the dangers of marriages contracted between consumptives. Statistics show that these are detrimental, not only to the persons so affected, but also to those not suffering with the disease, and to their children and to the servants, and the more limited the circumstances in which a family live, the greater is the danger of infection. He believed that by the enlightenment of the people on these points it would be possible to effect legislation forbidding the marriage of consumptives until two years after all symptoms of the tubercular taint had disappeared. There is objection, also, to alliances between young people who are suspected, and married people where one or the other is ill with consumption should be professionally advised of the danger threatening the healthy members of the family, and attention should be called to preventive measures that are likely to serve at the same time as the means of prolonging life. In families whose circumstances preclude the application of such preventive measures, the infected party should be removed, especially if his or her expectorations are copious, to a curative resort for treatment.

Professor Rubner, of Berlin, discussed prophylactic measures relating to dwellings, workshops, and places of public traffic, referring to the overcrowded condition of the homes of the poorer classes, there being frequently only 3 or 4 cubic meters of air for each person, the rooms being filthy and dark, and frequently a lack of water. This condition can only be remedied by amending and improving the building regulations.

With reference to shops and factories, it would be conducive to an improvement in the health of large cities to remove the factories and the dwellings of operatives beyond the outskirts. The contamination of the air by dust in the factories should be prevented as much as possible, and dusty work should be carried on in separate compartments and the workmen properly protected. All operatives should be carefully examined, and consumptive workmen and workwomen should be excluded from the factories.

Referring to public traffic, the speaker emphasized the necessity of instructing the public and training them to greater cleanliness with special reference to railway travel, calling attention to the necessity of avoiding soiling the floors, and the condition of the beds in the sleeping cars, and making ample provision for the removal of expectorations, etc.

Professor von Leube, of Würzburg, spoke of preventive measures against tubercular infection in hospitals, stating that they are not essentially different from those employed against tuberculosis in general. First in importance is the rapid disinfection of all excreta of tubercular patients, and the rigid observance of the practice of holding wads of cotton batting over the mouth in coughing, which are to be destroyed after using. Infection by inhalation is far more to be feared than infection by contact. Still, daily and thorough cleansing of the sick is commendable, and physicians and nurses who have been in contact, with the sick should disinfect their hands. Strict separation of tubercular from other patients in the hospitals the speaker does not consider necessary, and deems it sufficient to have the phthisis patients gathered together in certain wards.

Professor Virchow, of Berlin, privy councilor of health, spoke of the prophylactic measures to be observed in tuberculosis relative to articles of food, in which he stated that the principal propagators of the disease are cattle, partly through their flesh and more frequently through their milk. Pigs also contribute toward spreading tuberculosis, and so do domestic fowls, but the latter, of course, only in a small way. With cattle the flesh is not all infected—only certain parts, which are to be guarded against. Existing laws and ordinances, provided they could be made general, are sufficient to cover the meat furnished by slaughterhouses that are under control; but the inspection of imported meat and private slaughterhouses is inadequate and should be made more rigid. Professor Virchow believed that the tuberculin test is almost an infallible means of determining tubercular infection, and the importation of animals on the hoof from foreign countries should therefore be permitted only when this test shows that there is no ground for suspicion. He considered milk as the most dangerous carrier of the tubercle bacilli, which may have originally existed in it, or the tubercle bacilli may have gained ready access to it through the cow's udder, where innumerable tubercle foci may be found. The sole rational means of removing this danger would be the destruction of these organisms. As it is impossible to destroy these organisms, the danger must be minimized by sterilizing or scalding the milk. In regard to pork, Professor Virchow said that the regulations applying to the slaughtering and sale of this meat should be made more stringent from the fact that tuberculosis is found much more frequently in the pig than was formerly believed. Its seat, he stated, was principally in the lymphatic glands and in the neck of the animal; but with the matter under proper control these parts could be easily eliminated. He regarded the danger of tubercular infection through chickens and other domestic fowl as less than has been estimated, as the tuberculosis of these is not identical with human tuberculosis.

In concluding his remarks Dr. Virchow referred to his own pathological researches regarding congenital or transmitted tuberculosis, with the statement that tuberculosis had never yet been found in the fœtus or in the newborn with any certainty. Infection takes place after birth, but may result during the early life of the child.

Dr. Carl Schütz, of Kosen, spoke on the prevalence of pulmonary tuberculosis among the employees in the district of Erfurt and the methods for its prevention, confining his remarks principally to measures which should be observed among railway employees, and in which he stated that among this class of persons the extent of consumption is not very great, as the advanced cases and also cases that had been diagnosed early are generally eliminated by the examination for admission. To maintain this condition the greatest care should be exercised in examining applicants, including, if necessary, a microscopic examination of the sputa.

Dr. Baer, of Berlin, spoke on the relationship of alcohol to tuberculosis, in which he stated that the abuse of alcohol has a direct causative effect upon tuberculosis by weakening the functional activity of the individual organism, diminishing its power of resistance, and rendering it fit to receive and develop the germs of tuberculosis. According to the doctor, alcohol, in curative resorts for tuberculosis, should be used exclusively as a medicine and never as a food.

Dr. Michaelis, of Berlin, referred to the diazo-reaction and its prognostic significance in cases of phthisis, in which he emphasized the great value possessed by Ehrlich's diazo-reaction in the prognosis of phthisis where the occurrence and cessation of reaction with certain remedies is accurately obtained and observed. He stated that when the diazo-reaction is found in the urine of a consumptive the prognosis is unfavorable, and, independently of the extent of the disease, as shown by a careful examination of the lungs, means an unfavorable prognosis, and such patients should be considered as incurable.

Dr. Berger, of Neustadt, near Hanover, spoke on the struggle with tuberculosis in schools, in which he stated that as these institutions are under Government control, it was the duty of the officials to see that the possibilities of injury to the general health of the scholars were reduced to a minimum, and this can be accomplished by paying attention to the architecture of the buildings, in which is embraced its heating, ventilation, etc., besides giving careful attention to the personal hygiene of the pupils, both in and outside of school hours.

Dr. Ritter, of Berlin, also spoke on the protection of children, referring especially to the weakly children of the laboring classes, and pointed out that they were exposed to certain unsanitary conditions, the principal ones being (*a*) their home surroundings, (*b*) their want of proper nutrition, (*c*) being compelled at an early age to enter some industrial establishment for the purpose of a support, and (*d*) their being deprived when infected with disease of the chance of treatment or recuperation.

The doctor advocated very strongly removing the children to more suitable surroundings, preferably outside of the city limits, providing them with suitable clothing, and paying special attention to providing the children with nutritious food. He attached special importance to methodical lung gymnastics in the open air for these little ones, and by continued exercise in breathing and drawing long breaths the respiratory muscles are strengthened and the chest expands. He also laid great stress on giving the youngsters sun and sand baths whenever the weather permitted.

In closing his remarks, the doctor observed that the task for the physician was a grateful one, and for the community there is no more important obligation resting upon it than the proper care and treatment of the children of the poor.

Dr. von Weismayr, of Alland, contrasted the danger of infection in curative and health resorts, and stated that while the fear the public has of curative resorts is typical, health resorts are fearlessly frequented even by the healthy. He stated that it had been shown that curative resorts are without menace to their surroundings and exert rather a favorable influence, but as for health resorts this has not been demonstrated, and, judging from practices indulged in at these places, it is quite possible that infection in such resorts is not a rare occurrence. He advocated the necessity of enlightening the public as to the frequency with which tuberculosis is communicated through sputa and milk, and referred to measures which should be taken to prevent the spreading of tuberculosis through these two sources.

Dr. Portucalis, of Constantinople, called attention to the relationship of syphilis to tuberculosis, in which he stated that he had under observation 12 cases of syphilis ingrafted on former consumptives and had seen their tubercular condition steadily improve, the disease (consumption) gradually losing its hold upon them. Among the 12 cases 2 were medical men, all of them having phthisis more or less advanced, and several of them were unable to walk.

In concluding his remarks, Dr. Portucalis advanced the following views: (1) Syphilis ingrafted upon a consumptive is apt to change the course and nature of phthisis. (2) Syphilis ingrafted on consumptives becomes benign syphilis. He was therefore of the opinion that the antagonism of the bacilli of phthisis and of syphilis to each other results in the neutralization of their toxic effects.

Dr. E. Nocard, of Olfort, spoke upon the prevention of tuberculosis in cattle. The doctor stated that to combat human tuberculosis successfully bovine tuberculosis must be checked, and infected animals should be separated at once from the healthy ones. The doctor observed that the following rules should be carried out in checking the spread of tuberculosis among cattle: (1) Whenever a case of tuberculosis is discovered in cattle, the entire herd should be subjected to the tuberculin test. (2) The animals found healthy should be separated at once from those infected, and a new stable or one thoroughly disinfected should be assigned them, and no persons attending the diseased cattle should come in contact with them.

New cattle purchased outside should not be added to healthy cattle in the stable until they have successfully undergone the tuberculin test, and until the complete disappearance of tuberculosis among the animals the healthy ones should be subjected at least once a year to the tuberculin test.

Dr. Maar, of Ausbach, discussed the question of murrain and stable hygiene and the relation they bore to the war now being waged on human tuberculosis, and said that statistics showed the enormous extent of tuberculosis among domestic animals. The disease was shown to prevail particularly among cows, and that the spread of tuberculosis was actively favored by the incredibly bad hygienic conditions which exist in stables in which cattle are kept throughout the year. In consideration of the great significance of tuberculosis among animals in social and economic affairs, the improvement or removal of such conditions he deemed urgently necessary, stating that it should be the duty of the Government, of municipalities, and of agricultural societies to abate the nuisance, and in order to accomplish the best results he offered the following suggestions:

(1) Stock raisers and others interested in such matters should be instructed in hygienic subjects so far as they relate to the site, erection, ventilation, lighting, cleansing, and disinfection of stables, etc., by means of published suggestions that are terse, and in language that everyone can understand; or possibly a better scheme would be to have the elementary facts of hygiene taught in all the schools.

(2) The Government should furnish without cost plans, estimates, and specifications for the erection of all new buildings, and see that such plans are executed. Also, instruction should be imparted by persons who understand their business, such as veterinarians, stock inspectors, and civil engineers.

(3) Regulations should be made by the police for the proper supervision over the erection and cleansing of stables, etc.

(4) The Government should encourage by subsidies an interest in such matters.

(5) Prizes should be offered for the best publications on these subjects.

A very interesting paper on the tubercle bacillus in market milk and market butter was presented by Dr. Obermuller, of Berlin, who remarked that the commonest disease among cattle was murrain, which had been given close study by Villemin, Bollinger, Gerlach, Klebs, and Orth, and who had proved by numerous anatomical, clinical, and experimental tests that murrain was a disease closely allied to human tuberculosis. All of the above authorities, he observed, had fully demonstrated, and their experiments have subsequently been confirmed by Bang, May, and Hirschberger, that cow's milk contains tubercle bacilli, occurring in all varieties of murrain, and are all fully capable of affecting the human organism. In the light of Bang's, and Bollinger's discoveries, the doctor remarked that there is no longer any doubt that market milk, which is the mixture of the milk of many animals, is apt to contain live tubercle bacilli. Until 1895 a positive proof for this statement was wanting, but, by continued study of the biology of the tubercle bacillus, R. Koch discovered in tuberculin the means by which we are enabled to get a deeper insight into the disease prevailing among cattle. Dr. Obermüller conducted a series of experiments, covering a number of years, which convinced him that a great deal of the butter and milk sold in the larger German cities was infected with tubercle bacilli, and that in a few localities in Germany 60 per cent of all the cattle were infected with tuberculosis. He believed that a thorough reform in milk production and in the milk trade, such as better care for the cows in regard to shelter, food, and milking, was desirable and absolutely necessary. A strict supervision over the retail-milk trade should be instituted, and the sale of milk that has been in damp, musty places should be prohibited. Bacteriological laboratories should be established for the examination of milk in order to determine the presence of tubercle bacilli. In regard to the preparation of milk before consumption he stated that it should at least be scalded, but whether this suffices to really destroy the bacilli is still an undecided question. Milk for nurslings and children should always be obtained from dairy farms in charge of recognized experts. Milk which is intended to supply large cities, small communities, barracks, etc., should never leave the dairy without being pasteurized, while the butter should be made of pasteurized cream, which will give it better consistency. He observed that in general the pasteurizing process is to be preferred to sterilizing the milk. He stated that two indispensable deductions must be drawn:

(1) Intelligence must be disseminated regarding the dangers of incurring tuberculosis through the drinking of milk and eating butter made from milk containing tubercle bacilli, advocating the better education of the people by giving practical lectures on bacteriology in institutions established for that purpose.

(2) The Government should exercise control over the sale of all milk so far as tuberculosis is concerned by a rigid supervision and obligatory inoculation with tuberculin, and the use of cows for milking purposes that are infected with tuberculosis must be positively prohibited.

In conclusion, he expressed the hope that bacteriologists, chemists, and veterinarians should all cooperate for the purpose of effectually checking the great danger from infection that is concealed in milk, the chief nutrient of the people.

SECTION IV.

THERAPEUTICS.

[Section presided over by Professor von Ziemssen, of Munich, and Dr. von Schroetter, of Vienna.]

Privy Councilor Dr. Curschmann, of Leipzig, presented his views on the curability of tuberculosis with the remark that formerly the question whether consumption is curable had usually been answered in the negative, while to-day opinions are rendered in the affirmative with too little reserve. In a strictly anatomical and histological sense he regarded a cure in a case of pulmonary tuberculosis as very rare, and it more frequently happens that the disease is checked with cicatrization and destruction of the parts immediately involved. Many of these cases, in a clinical sense, may be called cures, as all local symptoms recede, and the patient under continuing favorable conditions and in good general health will be restored to full working ability. A still larger number of cases are relatively cured, local manifestations not ceasing altogether, but the general condition remains comparatively good. He stated that the permanent results obtained to-day were much more satisfactory than those of former years, and in the curative resorts, hospitals, etc., he estimated them at 20 per cent, and the favorable results obtained in the resorts are doubtless referable to the dietetic and physical methods of treatment pursued. Dr. Curschmann remarked that the prospect of a thorough cure of the disease will, of course, depend upon a variety of individual conditions and circumstances, and chiefly upon the length of time the disease has been progressing. If the symtoms are of recent origin the prognosis is favorable, and this renders an early diagnosis desirable and important, especially in the latent cases, but success may be attained sometimes in cases where both lungs are affected and where the disease is somewhat advanced. The treatment in cases of mixed infection is still crude, and the existence of other diseases in conjunction with tuberculosis detracts somewhat from our prospects of success.

Councilor of State Kobert, of Rostock, spoke on the proper medicinal therapeutics to be employed in tuberculosis, stating that it must be accepted as a fact that there is no true specific remedy for tuberculosis; and, furthermore, in miliary tuberculosis and phthisis florida every remedial agent is impotent. To abstain entirely from the use of medicines in the treatment of the disease is justifiable only in incipient cases, and in all advanced stages they are needed to reenforce Brehmer's method. In surgical therapy iodoform plays a prominent part, while in laryngological practice narcotics, especially codein, are very useful. The speaker said he did not agree with those who rejected antipyretics, and he believed that they were indicated whenever, by rest in bed or by hydropathic measures, a reduction of the temperature was unsuccessful, and that he considered pyramidon particularly an appropriate remedy in such cases. To relieve the cough expectorants should be used, and where the expectorations are putrid the inhalation of ethereal oils is of value. Remedies patronized as specifics, such as camphorated oil, cinnamic acid, etc., are not, properly speaking, specifics, but they act by exciting a vigorous leucocytosis.

Professor Brieger, of Berlin, referred to the treatment of tuberculosis with tuberculin and similar agents. The abject pessimism which succeeded the giddiness produced by Koch's discovery in 1890, he said, was unjustifiable, for Koch's preparations of tuberculin, the old as well as the new, are remedies inducing specific effects. The old tuberculin is highly valuable in determining the diagnosis in man as well as in animals.

Among the tubercular cases in the Berlin Institute for Infectious Diseases, 54 per cent responded to the test of the injection, and were recognized by this test as tubercular. The value of tuberculin consists precisely in this, that the incipient disease, which can not be diagnosed with any certainty in any other way, responds promptly to the test of tuberculin. For diagnostic purposes it should therefore be always employed, as when cautiously used it is not injurious in any case. The speaker's own observations have verified this fact, and also that in judging the effect of tuberculin, transient results are confounded with causative ones. Tuberculin, he stated, has without a doubt a curative tendency, but it must be used sufficiently long and in sufficient doses, and, even in cases complicated with secondary infection, it has often brought about considerable improvement, or checked the progress of the disease. But a specific effect can not be claimed for the specimens of tubercular serum that have thus far been in use.

Sir Herman Weber, of London, spoke on climatic therapy, describing in detail the climatic influences of high and low places and of the seacoast upon consumptive patients. He regarded the climate as a very important factor in the treatment of tuberculosis, but it should be reinforced by careful medical supervision, and when combined with a mountain climate, treatment in curative resorts is productive of the best results. With reference to the climate in low countries, he touched on the climate of forests and deserts. In wooded tracts the cold, damp, ground is a subject for consideration, also the modification of the light in woods with foliage, and in pine forests these objections are less pronounced. The speaker believed that the desert climate owes its reputation for purity of air to its richness in ozone, to warmth, and to abundance of light, but is objectionable for consumptives on account of the winds, which are saturated with dust and at times sweep the desert. Ocean voyages are recommended and can be utilized to good advantage by consumptives—the purity of the air, the evenness of the temperature, and the mental calm and rest connected with such voyages being considered of great advantage. In his concluding remarks on the utilization of different climates in the treatment of tuberculosis, the speaker emphasized the statement that in any climate the choice of abode is of the greatest importance, and it must have a great deal of sunlight and warmth, be sheltered from the winds, free from dust, and at a distance from factories and similar institutions. For the prevention of tuberculosis, any climate may be utilized, provided plenty of good nutritious food is within reach and long outings are taken daily. Mountain and seacoast climates have many advantages, but the blind confidence of patients in the climate alone often leads them into errors and causes aggravation of their symptoms. For the majority of patients he stated that the treatment in curative resorts is therefore to be preferred, and for the poor such treatment is a necessity.

Privy Councilor Dettweiler, of Falkenstein, in addressing the congress, laid great stress on the subject of hygienic and dietetic treatment of tuberculosis, and particularly on the treatment in curative resorts, remarking that this treatment, which is now receiving general recognition, consists primarily in furnishing the patient with what is adapted to his condition, fresh air and rest, and with these should follow hardening of the skin, facilities for enjoying fresh air, hygienic surroundings, proper attire, disinfection of effects, proper disposition of excreta, treatment of the cough and the employment of the proper medicines for alleviating all the symptoms of the disease. The effects of drinking water, of light, especially electric light, and the employment of massage and gymnastics are also to be considered. Patients on entering upon this course of treatment will be compelled to avoid much that is injurious, and to accustom themselves to that which is useful and beneficial; and after leaving the institution they will remain faithful to the habits and training acquired here. In order to carry through to perfection the necessary measures, a highly and thoroughly educated physician who has enjoyed long training and special practice is needed at the head of an institution; and the doctor believed that the multiplying of curative resorts would probably render it necessary to train physicians in special courses at clinics and in sanatoria in order to fit them for this special work. He mentioned the good results following this course of therapy with the statement that throat irritation, night sweats, and fever disappear, the appetite increases, and the general health is improved. The great advantage of this treatment is that it can be carried on in all countries free from climatic extremes, and that therefore the patient can remain near the place of his nativity. This will serve to facilitate the task of solving in all civilized countries the problem of the establishment of curative resorts.

Dr. Winternitz, professor extraordinary at the University of Vienna, spoke upon the employment of hydrotherapy in pulmonary phthisis, stating as his conviction, after an experience of nearly forty years, that no more effectual and no safer remedy exists which is applicable to all stages of tuberculosis and phthisis, and no remedy more rational and plain than hydrotherapy, which, of course, should be used in conjunction with dietetic and hygienic methods and open-air treatment.

He bases his assertion upon the following facts, namely:

1. As a tonic it lessens the tendency to sickness by counteracting nervousness and circulatory weakness. It allays assimilation to such an extent as to do away with a retrograde metamorphosis, stimulates all the forces, and promotes the apposition of new matter, thus acting in a preventive as well as a curative manner in checking the progress of consumption.

2. The danger of taking cold, with all its sequels, is entirely gotten rid of by hardening the body.

3. By establishing hot-house conditions, hydrotherapy will favorably influence local nutrition of the affected parts by collateral hyperæmia, active flow of the blood to and from the organs, and altering the processes of diffusion.

4. It will allay hectic fever and combat or even cut short night sweats; in this respect hydrotherapy surpasses all other methods of treatment.

5. It will strengthen and even awaken all known powers of the organism, and places it in a position to resist the onslaught of disease by annihilating or casting out and rendering harmless all bacilli, together with the virus produced by their presence in the body. This has been theoretically and practically demonstrated.

6. If the above assertions are correct, and of this there is no manner of doubt, then systematic and methodical hydrotherapy should be introduced not only in all curative places for consumptives, and in all home sanatoria, but should be made available for all classes of people menaced or suffering from tuberculosis.

In order to carry out these recommendations, Professor Winternitz advocated the establishment of shower baths with a strong water pressure in the sleeping apartments of the consumptive patients, and that the water should be as fresh and cool as can be obtained. Tepid water, he states, will not answer the purpose, and has no beneficial but rather a detrimental effect. Special male and female employees trained in the different modes of washing, bathing, and rubbing the patients are required. Professor Winternitz states that his method of treatment, which influences the disease etiologically, pathologically, anatomically, and symptomatically, and has extended over 400 closely observed cases, has effected a cure, or relative cure, in almost 80 per cent of the chronic cases. He states that even in cases that had been given up as incurable, the treatment resulted in subjective improvement and renewed hope of recovery. One great advantage, the doctor remarked, in regard to this method of treatment was the fact that if consumptive patients are unable to change their domiciles, or unwilling perhaps to do so, the treatment can be administered at their homes, and without interfering to any great extent with their duties.

Dr. Carl Schütze, of Borlachbad-Kosen, in charge of the sanatorium at the latter place, spoke upon the employment of hydrotherapy in pulmonary consumption, stating that for consumptives who are without financial means the principal thing is to get well, if possible, in the climatic surroundings in which they are obliged to pursue their calling, and as consumptives are peculiarly sensitive to the slightest modifications of temperature and barometric changes, it is absolutely necessary to render them hardy, accustoming their skin to changing external influences, especially as regards catarrhal conditions, which, even though slight, aggravate the condition of the lungs. Without regarding the etiology of consumption, the doctor believed that we have in hydrotherapy the most powerful means of checking a retrograde metamorphosis, and in this respect the water cure is also a great preventive of the disease. Dr. Schütze stated that in pronounced cases of phthisis with hectic fever and complicated with hæmoptosis, the rational and judicious employment of the water treatment acts as an alterative on the nutrition of the body, and at the same time it antagonizes in conjunction with the fever the toxic alkaloids coursing through the body, and finally it forms the only scientific and the best styptic against blood spitting. The doctor further stated that the troublesome and frequently dangerous dry cough, which sometimes defies all medicinal treatment, is generally improved by correct hydriatic measures, by breaking up the cough and stimulating the process of assimilation. He advocates strongly the adoption by curative institutions for consumptives of hydrotherapy, and which would constitute their principal method of treatment. With their facilities he believed it would be an easy matter for them to improve the statistics already so favorable of this method, and, furthermore, that all patients discharged as improved from such institutions, after having been subjected to this form of treatment, would continue the methods which had so materially benefited them and impart their knowledge to others.

Dr. Hölscher, surgeon in chief of the Hospital of the Three Kings, at Mülheim, on the Rhine, discussed the treatment of acute and chronic diseases of the respiratory tract by means of carbonate of guaiacol and creosotol, with the statement that the method inaugurated by Seifert and himself in 1891, of treating pulmonary tuberculosis with carbonate of guaiacol and with the analogous preparation, creosotol (carbonate of creosote), recommended by Chaumier, has since occupied a prominent position in the medicinal treatment of this disease, and the experience of a large number of close observers are in full agreement, and place beyond a doubt the eminent success which has been obtained by the employment of these medicines. At the same time careful feeding and, if possible, supernutrition forms an important factor in carrying out this method of treatment. Food rich in abumen, he observed, is to be preferred, as large doses of these drugs, guaiacol and creosotol, result in the disintegration of albumen in the body, and an examination of the urine shows that they, in combination with sulphur, are secreted by the kidneys, and this sulphur can only come from albuminous substances which, in consequence of the withdrawal of the sulphur, are disintegrated. As these remedies do not disturb or derange digestion like the acrid free guaiacol and creosote, but, on the contrary, restore to a normal condition the disordered digestive tract by checking the processes of fermentation and stimulating the appetite, increased absorption and assimilation of food become possible by their use. He stated that the effect produced by carbonate of guaiacol and creosotol is not exclusively a stimulation of the appetite and modification of the symptoms of tuberculosis, but it seems to act directly upon the exciting cause of the disease, namely, the bacilli. These drugs destroy or remove that which makes the existence of the bacilli a possibility, and besides, check fever, anorexia, night sweats, etc., by eliminating the poisons which produce them. The doctor remarked that the dark-colored urine which often appears is not a sign of poisoning, and need not cause the patient anxiety, and after the ingestion of large doses of creosotol free creosote is given off directly by the lungs, and the breath of the patient has a strong odor of creosote.

Professor Cervello, of Palermo, Sicily, spoke on the therapeutic value of formaldehyde in the treatment of pulmonary consumption, believing that on account of its volatility, diffusiveness, and good effects in checking the process of fermentation that it might be of valuable aid in the treatment of tuberculosis of the lungs.

Professor Cervello's clinical tests were made in the city hospital at Palermo, and of the 26 patients treated by him according to his system, and nearly all of whom were in an advanced stage of the disease, 10 have apparently recovered completely, 9 others almost entirely recovered, 2 are improving, 1 is stationary, 2 grew worse, and 2 died. He attributes the favorable results following his course of treatment as due to the oxidizing by formaldehyde of substances with which it comes in contact, and he assumes that the curative process is based mainly upon the process of oxidation.

Dr. Weber, of St. Johann-Saarbrücken, Lorraine, discussed the cure of pulmonary tuberculosis by hypodermic injections of vaseline, in which he referred to the antagonism existing between tuberculosis and carbonic acid, and in which he stated that if there was a sufficient amount of carbonic acid in the lungs tubercle bacilli could not develop. He stated that the pulmonary apices, on account of their location, contain a very small quantity of blood charged with carbonic acid and are, therefore, preferably attacked by tuberculosis. He quotes Ebstein in confirmation of the fact that a lack of carbonic genesis in diabetes mellitus results in the death of nearly half of all such patients from phthisis. All persons suffering from cardiac disease and who have venous hyperæmia of the lungs are to a great extent protected from pulmonary disease, and in the case of those suffering from emphysema they are to a great extent free from the tubercle bacilli. Dr. Weber refers to the immunity from pulmonary tuberculosis which exists among hunchbacks, in which the lungs are relatively small, but are richly impregnated with carbonic acid blood, although their deformity was caused by the tubercle bacilli.

In order to generate carbonic acid in the system he injects a combination of carbon and hydrogen, which, by oxidation, will be transformed into carbonic acid gas and water in the body. He has found such a substance in vaseline, which is easily taken up in large quantities and absorbed by the subcutaneous cellular tissue. He injected 10 grams of vaseline three times a day under the skin of the back, and has had good results in the cases of 30 patients treated by this method. Eighteen patients with cavities have been cured, and the others are still under treatment.

Dr. Warfwinger, of Stockholm, spoke on the order of meals in public curative resorts, emphasizing how important it was in connection with the open-air treatment to have the consumptives fed in a rational manner, giving them an abundance of nutritious food containing albumen and fatty substances and carbohydrates in proper proportion, but laying particular stress on an abundant supply of fat of great variety and divided into a large number of meals.

Dr. Alexander, of Reichenhall and Nervi, referred to his method of treating pulmonary tuberculosis by hypodermic injections of camphorated oil, remarking that in the first stage of pulmonary consumption spontaneous cures sometimes occurred, and that a similar result in this stage of the disease may be obtained in many cases by hygienic and dietetic treatment without recourse to medicines at all. He states, however, that the treatment with camphor is one that has been attended with good results in the last stage of consumption and in the cases of poor patients. Under this treatment he observed that the cardiac and respiratory muscles are strengthened, irritation, coughing, and expectoration diminish, fever and night sweats are removed, and refreshing sleep induced.

Dr. Petruschky, of Danzig, spoke on Koch's tuberculin in the treatment of tuberculosis, with the statement that if properly carried out a permanent removal of all signs of tuberculosis can be achieved even in cases where the patients calling can not be interrupted for any length of time and where treatment has to be administered while he attends to his regular work. A single course of treatment rarely suffices, he states, to remove permanently all signs of the disease, although he cites the cases of a number of former consumptives who after one course of treatment have been free from symptoms of tuberculosis and have remained immune. He believes, however, that the tuberculin treatment, in order to thoroughly eradicate the disease, should be administered twice a year, and that two years are necessary before the treatment is completed and a longer time is only necessary when there is interference and delay by secondary infection.

The doctor mentions as appropriate subjects for treatment (1) those who are in the early stages of tuberculosis without complications, (2) cases in which there has been destruction of tissue, uncomplicated by fever, without secondary infection, and with the general health not much impaired (3) such cases as disclose a tendency to secondary infection, and where the general health is impaired a rigidly enforced dietetic and hygienic course should supplement the tuberculin treatment.

He advocated the establishment of well-conducted dispensaries in which tuberculin could be administered successfully, in which there would be no essential interruption in the callings of the patients and the expense to them would be a trifling matter.

Prof. E. A. de Schweinitz, of the Columbian University, and director of the biochemic laboratory, Agricultural Department, Washington, D. C., read a paper before the congress on the treatment of tuberculosis with antituberculosis serum.

He stated that where cases of tuberculosis were treated in localities favored by climate and elevation, and where improvement or recovery had taken place, it was rather difficult to tell how much of the good results could be attributed to special climatic conditions and dietetic methods and how much to any particular therapeutic course. According to Professor de Schweinitz, of all methods which are recommended as specific for the treatment of tuberculosis the employment of a serum prepared in accordance with scientific principles is the one which in his experience has given the most satisfactory results. Five or six years ago he published a series of experiments which showed the possibility of producing immunity to tuberculosis in guinea pigs, by treating the animals with the attenuated cultures of the tubercle bacilli. These attenuated cultures are obtained by letting the tubercle bacilli grow for years in a cultural soil that has an acid reaction. Dr. de Schweinitz states that the director of the Loomis Sanitorium for Pulmonary Diseases in New York City has used the serum prepared according to his (de Schweinitz's) method for the past eighteen months, and as a result of such treatment informed him that of 90 patients so treated 19 per cent were completely cured, 7 per cent very much improved, 57 per cent somewhat improved, and 17 per cent not improved. The Doctor stated the cultured bacilli contained a good deal of fat and fatty substances, and it is probably on account of this that it is so difficult to combat the bacilli when they have once gained a foothold in the body, and he believes that the elimination of the fatty and poisonous bacilli products as they exist in the body explains the good results obtained with his injections. He stated also that he was engaged in preparing a serum that would find successful application in the cases of consumptives infected with streptococci. While believing it possible that a specific serum like that discovered for diphtheria might be obtained for use in tuberculosis, it might require further experimentation and development, but he stated that a great improvement in the condition of consumptives through the use of a serum scientifically prepared had been fully demonstrated, and if to this be added climatic treatment and good nutrition, complete cures will undoubtedly result.

The Doctor, in concluding his remarks, advocated the appointment of a permanent international commission for the purpose of examining and reporting upon the scientific methods proposed for the treatment of tuberculosis.

Dr. Friedrich, of Dresden, made a few a remarks on sea voyages as a preventive of pulmonary phthisis, remarking that such trips, when taken in connection with one's chosen calling, are of great prophylactic significance, and the choice of the patient need not be restricted to a certain ship or route. For voyages to be undertaken by those who are sick, sailing vessels, if properly equipped and well appointed, are preferable, but the Tropics must be avoided.

In cases of hæmoptysis sea voyages are not contraindicated, but the route and destination should be considered. Sea travel is contraindicated, he believed, where there is a tendency to seasickness or acute phthisis.

Dr. Fritz Egger, of Basle, gave an account of the treatment of pulmonary tuberculosis in the mountains. The assertion, according to the Doctor, that has been made that a practical cure is to be effected only in the climate in which the patient afterwards has to live, i. e., in his own native place, because if such is not the case he will, without treatment, relapse, is not applicable to the mountains. The general improvement of patients and the condition of the blood of those that have returned from the mountain curative resorts to Basle disprove the truth of this statement. He remarked that the experience on which was based the great superiority of the mountain climate over that of the lowlands in the treatment of tuberculosis had been gathered from among the rich, and from others who had taken up their abode in the mountains for a long period. He remarked that we have no satisfactory record as yet that patients suffering with tuberculosis are cured more speedily in mountainous resorts than in those located elsewhere, nor can it be stated positively that the mountains are always the proper place for such resorts in which the subsequent treatment of patients can be accomplished. He believed, however, that where it is feasible and can be done without great expense, curative resorts in the mountains should have the preference in the treatment of tubercular patients. With such patients as are seriously ill with consumption, the mountains, according to the Doctor, are capable of at least checking the progress of the disease. Nearly all such persons, after returning to the lowlands, pay the penalty by going into a decline or soon dropping off, while in the mountains, the progress of the disease being stayed, they can live like healthy persons. Thus far only rich consumptives have been able to take up their permanent abode in the mountains in order to prolong their lives; it might not be amiss to consult about ways and means as to how people in moderate circumstances, or even those without means, might for a longer period be accommodated in the mountains. The great expense could be reduced by colonizing and by providing occupation for the sick by which to earn at least a part of their livelihood.

Dr. Wolff, of Reibaldsgrun, submitted a proposition to test the influences of climate on tuberculosis, stating that the importance of curative resorts in the great battle against tuberculosis should be fully recognized. At the same time he believed that it would be necessary, sooner or later, to make an investigation of the influence of climates, advocated by many experienced physicians, especially mountainous and seacoast climates, in order to ascertain to what extent the result of such investigations might be utilized in the treatment of this disease. Clinical and physiological investigations made by individual physicians are often considered, he observed, as merely in the interests of their own localities and can not lead to results valued by service. He advocated the organization by the central committee of the congress of a commission of scientific young men, who should be provided with the necessary means for an exhaustive investigation of this subject. The committee should agree on certain methods to be pursued, and should uniformly examine into the assimilative changes in the blood of healthy and of sick persons in localities of various climatic conditions, and their attention should be especially given to the changes that are produced by moving from one climate to another. Such clinical experiences of a large number of trained specialists would when collected form an interesting and valuable contribution to science.

SECTION V.

SANATORIUMS.

[Section presided over by Dr. Gaebel, of Berlin, and Dr. Dettweiler, of Falkenstein.]

Prof. Ernst von Leyden in his remarks referred, in a brief historical sketch, to the present method of caring for tuberculous patients in sanatoriums, giving credit to Hermann Brehmer for taking the initiative in strongly advocating this method of treatment, and who erected in 1854 the first sanatorium for this purpose. Following on the lines laid down by Brehmer, other sanatoriums were erected throughout the German Empire, and also in foreign countries. The satisfactory results following the establishment of these sanatoriums caused a widespread interest in the further development of this plan of treatment, and induced those interested in sanitary hygiene to believe that as a substitute for these isolated and independent sanitoriums it would be advisable for the Government to take under its control and supervision the erection of sanatoriums on a larger scale, and that a systematic effort should be started for combating this disease.

Professor von Leyden spoke of the efforts made for the establishment of sanatoriums by Hogt, of Berne, followed by Goldschmidt and Dettweiler, and in September, 1894, at the International Congress of Hygiene, at Budapest, Professor von Leyden advocated very strongly governmental control of sanatoriums, showing the great advantages to be derived under this system of administration, and the decided advances that could be made in checking this disease by systematic and united efforts.

In the year 1896 a movement was started in Berlin, under the direction of B. Fränkel, Althoff, and Von Leyden, which resulted in the formation of the Berlin-Brandenburger Society for the treatment of tuberculous patients. At a later date the Red Cross Society, largely through the instrumentality and energy of Gottwold Pannwitz, became interested in the development of such work, and subsequently these independent efforts were centralized in the establishment of the German central committee for the erection of sanatoriums for the tuberculous.

At the present time there are in the German Empire (either completed, in course of construction, or projected) between 30 and 40 sanatoriums in which all patients suffering from tuberculosis may receive care and treatment.

District Councilor Meyer, of Berlin, spoke on the need of institutions for the treatment of lung diseases, stating that medical science had demonstrated the value of providing special places (curative resorts) for the treatment of cases of tuberculosis, and that the solution of this problem should not be left to the exertions of individuals, but that financial assistance should be undertaken by the State authorities, and the cooperation of the local authorities should be encouraged in every community in the organization of branch societies. He advocated as the first step toward the establishment of such resorts the accumulation of a fund with which to defray the expense arising—

First. From the acquisition of appropriate ground and the erection thereon of properly fitted up buildings.

Second. From the management of these buildings, which will require the principal monetary outlay.

Third. From the care for the needy families of patients in said institutions.

He believed that at least two curative resorts, one for men and one for women, should be erected in every province of the German Empire.

Dr. R. Friedeberg, confidential medical adviser of the central committee of the sick-fund societies of Berlin, addressed the congress on the cooperation of the sick-fund societies and their physicians in sustaining the curative resorts, stating that there is no class of the people whose ranks are so devastated by pulmonary tuberculosis more than the industrial class organized in the sick-fund labor unions, and that in the centers of industry at least 50 per cent of all deaths that occurred and by far the larger proportion of disability cases are due to phthisis.

He stated that the sick-fund societies alone are not strong enough to undertake the treatment of consumptives in curative establishments, but that it is necessary to procure the cooperation of the disability and old-age insurance societies, as these associations command greater means, and are therefore enabled to render valuable service in carrying out prophylactic measures based upon rational ideas. In the management of curative resorts the intelligent cooperation of the physicians employed by the sick-fund societies is indispensable, and upon them rests the responsibility of seeing that appropriate cases receive early treatment. The Doctor recommended that the people should be enlightened and trained to think hygienically and to live in accordance with the laws of health, and in order to carry out such suggestions he advocated—

1. Lectures on hygienic subjects by the physicians in charge of all curative resorts.

2. Lectures before all sick-fund societies by their medical superintendents.
3. The distribution of sanitary and hygienic literature among the members of the sick-fund insurance societies.
4. Posting up in factories and other industrial establishments hygienic rules.
5. Compulsory physical examination annually of all members of sick-fund societies, and the proper disposition of such cases as require treatment.
6. Ways and means to be provided by which the sputa may be examined without cost in state institutions, in college laboratories, in hospitals, and other places.

Councilor of Architecture Schmieden, of Berlin, addressed the congress with reference to the construction of curative resorts, with the statement that in locating and managing a public curative resort the greatest possible simplicity and economy is to be considered consistent with modern architectural demands, and that architectural beauty is everywhere to be subordinated to hygienic necessity. He advocated on principle the treatment of the sexes in separate institutions. He referred to the selection of the site of the sanatorium, stating that it should be sheltered from prevalent winds, especially north and east winds, and should have the longest possible exposure to the sun. In mountainous regions sections of broad valleys are to be selected, open toward the south, where there will be facilities for patients to take walks on level as well as gently rising ground. Regions in which there is much humidity should be avoided, and the underlayers of the soil should be dry and as free as possible from organic matter. The air should be free from dust, smoke, and soot, and the site selected should be as far removed as possible from industrial enterprises. Close proximity to towns or villages, and particularly to public drinking resorts, is undesirable, but value should be attached to easy access by railway. In selecting a suitable site for the proposed building, good water and a liberal supply of it for drinking and other purposes, as well as the facilities for disposing of garbage and excreta without difficulty or objection, should be fully considered.

Councilor Schmieden, in speaking of the plan of the entire establishment, stated that the buildings should be so constructed as to form an additional protection against winds, and that in drawing up original plans the question of a future enlargement of the building should be kept in view. He considered it best to have the patients housed either in one large building or in several smaller buildings, and if the latter method is decided upon one physician should reside in each. The kitchen should be separated from the main building and should be located in an annex.

The quarters of all employees should be strictly separated from those of the patients, and the laundry should be in a building located at some distance from the hospital building. If a dairy is connected with the establishment, the cow stable should be located at a considerable distance from it and completely isolated.

Referring to the internal arrangements of the buildings, Councilor Schmieden stated that the rooms intended for occupancy by the patients should be on the one side, and that the dormitories should be arranged as sleeping and not as sitting rooms. Each bedroom should contain at least 30 cubic meters of air, and separate rooms and beds should be provided for fully 10 per cent of the number of inmates.

Where there are several beds in a room low partitions should be put up between them, and between the beds there should be a space of at least 1 meter. The hallways should be provided with couches and should be thoroughly ventilated. The bathrooms should be bright and sunny and maintained at the proper temperature. Ample provision should be made for rooms in which to conduct examinations, for laboratory and dispensary purposes, and for cases under special treatment. The construction of the floors, walls, and ceilings should be considered with the view of rendering them as far as possible impervious, so that they can be easily mopped or washed. The introduction of heat by methods that produce no dust, the installation of electric lights, water pipes, and proper conveniences for disinfecting the sputa and other excreta should be given careful attention. Soiled linen, before removed from the building and taken to the laundry, should be boiled or otherwise sterlized.

Staff Surgeon Schultzen, of Berlin, spoke on the arrangement and management of curative resorts and the results of treatment in such establishments. As his views coincided very closely with those expressed by Councilor Schmieden, it will be unnecessary to give an abstract of his paper, except where he supplements the remarks of Councilor Schmieden.

Dr. Schultzen stated that for the accommodation of the patients during summer months, Docker's portable barracks might advantageously be used and afford opportunity for renovating and ventilating the curative buildings. The establishment should be under the management and sole direction of the surgeon in chief, who should not only have a thorough clinical training, but should be experienced in practical matters and thoroughly conversant with the laws and regulations governing social organizations.

The nursing in such establishments he believes could be best performed by women. He emphasized the importance of receiving patients for treatment in the early stages of the disease and rejecting all cases too far advanced. He also advocates the establishment of transition resorts, where a patient who has been discharged from the curative resort may remain for some time, and where he may be employed at suitable work at fair compensation, among the most favorable surroundings. Rules for a uniform system of reports regarding results of treatment should be adopted by a committee consisting of the physicians of curative resorts, representatives of the imperial bureau of insurance and the imperial board of health, of the disability and old-age insurance institutions, and the representatives of industrial enterprises. In this way he believed that the immediate as well as the permanent results of treatment in each institution could be compiled annually and forwarded to a central committee, whose duty it would be to prepare and issue a collective report. After the preparation of these reports for a few years the doctor believed that sufficient data would be obtained on which to base a valuable and unerring judgment on the practical benefits of the movement.

Statistical tables prepared by the imperial insurance bureau for the information of the medical congress, relating to the treatment of tubercular and other patients insured in the German insurance societies and licensed institutions, showed that as the result of treatment in such establishments the mortality rate was considerably reduced.

Staff Surgeon Pannwitz, the secretary-general of the German central committee for the establishment of places of treatment for consumptives, stated that the care of consumptives in health resorts, if it is to accomplish its purpose, places upon us two important duties, namely:

(*a*) The care for the families while the consumptive patients are undergoing treatment in the health resorts.

(*b*) Procuring work for those discharged from the resorts.

He believed that this work should be undertaken by the benevolent and charitable societies, and that the Red Cross Society was the best adapted for carrying out this undertaking in a systematic way. He advocated also the establishment of resorts for supplementary treatment where discharged patients can be cared for and engage in rural pursuits.

Dr. Westhofen, of Ludwigshafen, spoke on the curative establishment of the Aniline and Soda Manufacturing Company at Ludwigshafen, Baden, stating that such a resort for operatives affected with lung disease was opened at Dunnenfels in September, 1893, and that only such patients were received in the institution as showed undoubted evidence of tuberculosis by the presence of the tubercle bacilli. He stated that the course of treatment was at least six months, and usually extended over one year, and the families of the patients, while they (the patients) were under treatment, are cared for. Such cases as could not be relieved by treatment were given a sufficient amount of money to enable them to enter a new vocation, or received a light pension. Only such patients were regarded as cured who, by reason of general good health, the absence of bacilli, and the healthy condition of the sputa, appeared well and strong, and who remained so for a year after their discharge from the health resort. He stated that permanent good results could only be expected after a full term of treatment, and that treatment for less than the full term results only in temporary improvement, which is of little value to the working man. Aside from this, he remarked that there is danger that frequently recurring relapses will bring the treatment into disrepute with the public, and especially with the sick-fund societies that are most deeply interested in the success of the treatment. The Doctor remarked that the establishment of places for treatment of consumptives should go hand in hand with prophylactic measures, namely, the construction of good and cleanly dwellings, suitable baths, and the erection of well-ventilated resorts of recreation for convalescents and others who may require it.

Professor Ewald, general secretary of the Society for Establishing Curative Resorts for Children, stated that institutions for the treatment of children along the seacoast of Germany were the best prophylactic measures that could be instituted for checking the tendency to consumption in young people by building up the general system and by relieving those conditions which favor the development of the disease, and the treatment in these places resulted in complete cures in cases of incipient tubercular conditions of the internal organs, especially the respiratory organs and all external local manifestations, such as enlargement of the lymphatic glands, tubercular joints, etc. He urged the desirability and necessity of increasing the number of seaside curative resorts as the most effective means for successfully combating consumption in the treatment of children.

Dr. Schmid addressed the congress on the establishment of public curative resorts for consumptives in Switzerland, stating that at the present time there are seven curative resorts located in the Swiss cantons, with an aggregate of 366 beds, and that all of these resorts have been endowed. Considerable amounts of money, he stated, have already been collected for establishing other resorts of treatment.

Dr. C. A. Halbach, of Barmen, spoke on the cooperation of public societies in the suppression of tuberculosis, with the statement that in order to accomplish the greatest good there should be organization and the work centralized as far as possible. The cooperation of public societies, if properly directed, will bring capital and labor into closer relationship and will be able to conciliate all differences growing up between employers and employees, and finally it will tend to render the whole affair one of national concern.

Dr. A. Baginsky spoke on the establishment of curative resorts for children, stating that the idiosyncrasy of the child renders it peculiarly susceptible to tubercular infection, and that ethical and pedagogic considerations seem to suggest the desirability of separate institutions for the treatment of children suffering from tuberculosis. He stated that infection by contact plays just as important a part in the tubercular disease of children as does inhalation, and that when constructing resorts for their treatment special attention should be paid to facilities for ventilation and cleanliness. He advocated that proper provision be made in these resorts for the education of the children, combined with the course of medical treatment, suggesting also the pavilion system as best adapted for the treatment of children.

Dr. Adolph Hohe, of Munich, spoke on the movement in favor of establishing health resorts for the middle class, referring to the fact that the movement in Germany had been chiefly confined to the relief of indigent sick and to the laboring and domestic classes, while the great middle class of the people had been left without help or protection. He stated that during the past year a society had been formed in Munich which had for its object the establishment of a resort to meet the needs of the middle class suffering from tuberculosis, and who are either not entitled or not willing to be admitted into public curative resorts.

With a similar object in view, and following the example of Munich, a society was also organized during the past year at Wiesbaden.

Passed Asst. Surg. George T. Vaughan, a delegate from the United States Marine-Hospital Service, read a paper before the congress on the establishment of a Government sanatorium in the State of New Mexico for the treatment of tubercular patients, and to be known as the sanitary ranch of the United States Marine-Hospital Service.

The establishment of such an institution was deemed advisable by the authorities on account of the large number of cases of tuberculosis occurring among the sailors of the merchant marine, and the unsatisfactory results, as shown by the annual statistical report of this branch of the Treasury Department, which have heretofore followed the usual treatment of such cases.

The Surgeon-General of the Marine-Hospital Service was impressed with the necessity of inaugurating some system of treatment by which the mortality rate in this class of cases could be reduced, and, after examining carefully the good results following the treatment of similar institutions abroad, determined upon this measure of carrying out his practical ideas. The sanatorium has been established at Fort Stanton, N. Mex., and is located in the arid regions of the United States, where the elevation, temperature, and precipitation have been shown by experience to be most favorable for the successful treatment of cases of tuberculosis.

In future all sailors of the merchant marine suffering with tuberculosis will be transferred, whenever practicable, at Government expense to the sanitary ranch for further treatment, where they will have the benefits of outdoor life and a dry climate, with an abundance of sunshine.

In summing up the work of the congress, and before closing this report, I shall endeavor to state briefly under each section, the important subjects on which the congress appeared to place the greatest emphasis:

SECTION I.

1. The necessity for compiling statistics upon correct scientific principles in reporting cases of tuberculosis.

2. Vocations that have a decided determining influence in disseminating the disease, such as:

(*a*) Nursing patients suffering from tuberculosis.

(*b*) Occupations that conduce catarrh or cause bronchial obstruction, and which includes work in factories, where the lungs become filled with dust, also work in establishments where the dust becomes laden with corroding or sharp-edged particles.

(*c*) Vocations which require such positions of the body, while at work, as to prevent a proper inflation of the upper lobes of the lungs.

(*d*) Vocations requiring a sedentary mode of life, resulting in deficient muscular development, heart enfeeblement, and an impairment of the system to resist disease.

SECTION II.

1. The tubercle bacillus is the only immediate cause of the different phases of human tuberculosis.

2. The source of infection is solely in the organism, as outside of the human or animal organism the tubercle bacillus does not thrive.

3. Little or no danger from infection is to be apprehended in incipient cases of pulmonary consumption, and not until the contents of cavities are evacuated by coughing does the disease become a menace to those in immediate contact with such patients.

4. The febrile condition in cases of pulmonary consumption is due to the presence of secondary bacteria, the rise of temperature in such cases being caused by the poisonous changes induced by the presence of the streptococci. Without such mixed infection fever is usually absent.

5. In all curative resorts tubercular patients suffering from mixed infection should be separated from those having the disease in an uncomplicated form.

6. Congenital tuberculosis is rarely found, and where it has occurred the mother was found to be suffering from the disease and the organs of generation were involved. A tubercular condition of the father does not influence hereditary transmission.

7. The immunity of certain persons to consumption, whether congenital or acquired, has not been determined, nor has it been demonstrated that such a condition exists as a congenital or inherited tendency to consumption.

SECTION III.

1. The necessity for the utmost precaution on the part of sanitary officials in guarding against tubercular infection; educating the people to appreciate and recognize the incipient symptoms of phthisis, and the regulations to be followed during the progress of the disease; in factories and other industrial establishments the importance of isolating tuberculous cases and reporting such action immediately.

2. The danger attending the marriage of consumptive persons from infection, and the advisability of enacting legislation forbidding the marriage of tuberculous persons until two years after the symptoms of the disease had disappeared.

3. Improving and amending the building regulations, with reference to the dwellings of the poor, factories, and public traffic.

4. The importance of the immediate disinfection of the excreta of tuberculous patients under treatment in hospitals, and the segregation of phthisis patients in special wards.

5. The exercise of the most rigid measures to prevent the spread of tuberculosis through articles of food, such as the flesh of cattle, pigs, etc. Cows' milk, which is a fruitful source of and carrier of the tubercle bacilli, should be sterilized or scalded before using.

6. The importation of animals on the hoof from foreign countries should be permitted only after being subjected to the tuberculin test, which is an infallible means of determining tubercular infection.

SECTION IV.

1. In a histological and anatomical sense, complete cures in cases of pulmonary tuberculosis are extremely rare. Clinically speaking, a large number of cases may be considered cured, as all local and constitutional symptoms subside, and the patients are able to resume their usual avocations. A still larger number of cases are relatively cured, in which a few local and general symptoms of the disease continue to manifest themselves.

2. There is no true specific remedy for tuberculosis, and in miliary tuberculosis every remedial agent is impotent. A specific effect can not be claimed for the specimens of tubercular serum that have thus far been in use.

3. The value of tuberculin consists in the fact that cases of incipient pulmonary disease which can not be diagnosed with certainty in any other way respond promptly to the test of tuberculin. For diagnostic purposes, therefore, it should always be employed, and when cautiously used it is free from danger.

4. Climatic therapy, when combined with careful medical supervision and treatment in curative resorts (sanatoriums), is an important factor in the management of tuberculous patients. A climate free from extremes of heat and cold, rich in ozone, with an abundance of pure air and sunlight, but free from dampness, humidity, and cold winds, should be selected for the treatment of consumptives.

5. The importance of selecting competent physicians, who have undergone a special course of training and who have had experience in sanatoriums for supervising and directing the treatment of patients with tuberculosis in curative resorts.

SECTION V.

1. A short historical account of the initial movement in the development of sanatoriums, and subsequent efforts for the location, erection, and administration of curative resorts (sanatoriums).

2. In the establishment of curative resorts the following points should be carefully considered:

(1) Elevation, location, and suitable environment of site.
(2) Endowment of such establishments.
(3) Proper choice of material for treatment.
(4) Provision for patients without means.
(5) Provision for the families of patients.
(6) Provision for patients who after treatment are compelled to change their occupation.

3. The accumulation of a fund as a preliminary measure in the establishment of curative resorts. Governmental control of sanatoriums in which all district and municipal societies and organizations are urged to cooperate.

4. Separate resorts should be used in the treatment of men and women, and, if possible, only for the same class of patients. There should be one large building or a number of small detached buildings. Location should be elevated, protected from winds, dry and sunny, removed from the neighborhood of all industrial establishments, and free from noise, dust, smoke, and soot. Quarters for employees, kitchen and laundry buildings should be separate and removed from the hospital building. Ample facilities should be provided for the disinfection of sputa and excreta, and sterilization of all soiled linen before being sent to the laundry.

5. The average daily cost of each patient should not exceed 75 cents, basing this estimate upon an establishment of 110 to 120 beds, and with all the beds occupied. The above amount should also cover the payment of the interest and the liquidation of the capital invested in the institution, including the necessary repairs to the buildings and grounds.

6. Patients suffering from tuberculosis in its advanced stages are not proper subjects for sanatorium treatment and should not be admitted.

7. The urgent need of the establishment of sanatoria for children, locating them, if practicable, on the seacoast.

In attempting to contrast the relative importance and value of the subjects discussed under the several sections into which the work of the congress was divided, it might, I believe, be stated without contradiction that the greatest interest was shown by the delegates in the reading of the papers dealing with the subject of sanatoriums, and upon the discussion of practical questions connected with the organization and construction of such institutions.

On the Continent of Europe the efficacy of curative resorts for the care of tubercular patients can no longer be regarded in the light of a doubtful experiment. Their establishment is a recognized feature in practical therapeutics, and to-day they occupy a well-defined and permanent position in the treatment of this disease.

Especially is this the case in Germany, where the success attending the administration of sanatoriums has been eminently satisfactory, and where it is universally accepted as the most efficient method that can be employed in the treatment of persons suffering with incipient tuberculosis. A large number of these sanatoriums, under either corporate, municipal, or govermental control, are now scattered throughout the German Empire, well organized and equipped, and their wonderful growth in the past few years is a convincing argument of the necéssity for their existence and for their further development.

The system adopted on the Continent for the administration of sanatoriums is probably calculated to secure the best results under governments where paternalism exists in a more or less accentuated form, but it is by no means certain that the same inflexible discipline and unbending adherence to minute details which pertains to their management abroad would meet with equal favor in our own country. If curative resorts are to become a popular and practical method of treatment in the United States, it will be necessary to exercise a reasonable degree of latitude in all matters relating to their government, placing them under liberal regulations and relying largely upon the active interest and intelligence of patients in cooperating with the sanatorium officials in carrying out this form of treatment.

Our main reliance for the successful management of curative resorts must be based upon the intelligence of the people by teaching them their responsibilities to the state and to society, and by affording them through public instruction an opportunity for appreciating the benefits to be gained from a practical knowledge of the principles of hygiene and sanitary science, and, furthermore, pointing out the danger which confronts them by neglecting, whenever their condition demands it, to avail themselves of the advantages afforded by a course of treatment in such establishments.

The growth of the movement for the establishment of sanatoriums throughout the United States has been extremely deliberate, and the measures that have been instituted for the organization and administration of these institutions have certainly not been commensurate with the efforts nor proportionate to the success that has attended their establishment abroad. This apparent lack of interest in the adoption of a well-recognized method of treatment, and one which has commended itself and has been in successful operation on the Continent of Europe for many years, may possibly be due to the fact that pecuniary obstacles have blocked the pathway of progress and are largely responsible for our shortcomings in this direction. But, independently of financial considerations, the public has only within a short time realized the significance attached to sanatorium therapeutics, nor has it fully appreciated the great benefits to be derived by patients affected with incipient tubercular infection from undergoing a prescribed course of treatment in such institutions.

In 1884 the construction of the Adirondack Cottage Sanatorium situated at Saranac Lake, N. Y., was commenced. It was incorporated under the laws of the State of New York, its management being controlled by a board of trustees, and was the first institution in America to undertake the care and treatment of persons suffering with incipient tuberculosis. The steady growth in public favor and popularity of this sanatorium under the direction of its president, Dr. E. L. Trudeau, as shown by its annual reports, is a practical illustration of what can be accomplished in the treatment of incipient tubercular infection where the management of such establishments is conducted on rational and scientific principles.

A State hospital for the consumptive poor was opened in October, 1898, at Rutland, Mass., and has already amply demonstrated its usefulness.

A few other institutions based upon similar plans, and following more or less closely the general methods of administration adopted by the Adirondack Cottage Sanatorium have been located through individual and organized efforts during the past few years in the Northwest and also in the mountainous districts of North Carolina, but their growth in general has not exhibited any great degree of vitality and there has been an absence of well-directed effort on the part of the profession for the purpose of considering the practical value to be placed on a course of treatment in such institutions. The establishment of the proposed sanatorium by the United States Marine-Hospital Service is the first official recognition by the National Government of a plan of treatment originally advocated and subsequently adopted by Hermann Brehmer, in 1854, and which observation and years of practical experience have stamped with their approval.

The question may probably, and very naturally, be asked by many of those who look for immediate and tangible proofs of the benefits likely to result from the deliberations of the Congress, "What has been accomplished in the way of increasing our knowledge of this disease, and what evidences have we that through its instrumentality any practical advances have been made in the treatment of tuberculosis?" If the work of the congress has not been such as to enable us to place a true estimate upon the practical and economic value of the results accomplished, nor to reply satisfactorily to this direct inquiry, it has at least pointed out what has been done in the past for arresting the progress of this disease, showing us our deficiencies, and placing us in a position for arriving at a clearer understanding of the best methods to be pursued and the proper direction which should control our efforts in all future work connected with the study and treatment of tuberculosis.

Before concluding this report it affords me much satisfaction to place on record my appreciation of the kindness and hospitality extended by the German authorities to the delegates representing the several departments of the United States Government at the International Medical Congress on Tuberculosis. The uniform courtesy shown by the officers in all matters of an official and social character was particularly gratifying, and will always be remembered as among the pleasurable incidents connected with the meeting of the congress.

REPORT ON WOUNDED FILIPINOS AT CAVITE HOSPITAL.

By C. D. BROWNELL, *Passed Assistant Surgeon, United States Navy.*

In the last part of May General Aguinaldo established a hospital at Cavite, and here many of the sick and wounded of the insurgents and the Spanish prisoners were brought.

The hospital was a convent, but had been vacated by its former inmates for some safer retreat at the commencement of hostilities. It was large enough to accommodate the patients and fairly well ventilated, but as there were only about 100 cots, and the patients numbered over 200, more than half of them had to lie upon the bare floor. Many of the wounded had lain in the field from one to five days without treatment before being brought to the hospital. After their arrival their injuries were badly dressed, and the dressings infrequently changed. As a natural result, suppurating and sloughing wounds were the rule, and a thoroughly septic atmosphere was established in the building.

After all of the operations (excepting one, where the patient died the next day), in spite of antiseptic precautions, there was some suppuration. This is partly accounted for by the fact that the changing of the dressings had in a great measure to be left to the careless and uninterested attendants.

All the operations, as given at the end of this report, were performed by medical officers from the American fleet.

The native physicians were poorly supplied with instruments, but in no instance, even when all that was required was at hand, did they perform an operation.

The greater part of the patients, 181 Spaniards, were removed to Manila, on June 19, by permission of Admiral Dewey. The majority of the patients were suffering from malarial fevers and dysentery.

Of the wounded, there were 58 with gunshot wounds, 11 with machete wounds, and 2 injured by pieces of shells.

Gunshot wounds.—Of these, 36 were due to the Mauser rifle and 5 to weapons of heavy caliber, probably the Spanish Remington, as one of these bullets was removed from a patient and it exactly fitted the point of entrance in a comminuted fracture of the femur in another patient. The other 17 were superficial. In nearly all there had been suppuration, and the character of the missile inflicting the wound could not be determined.

There were 26 patients with flesh wounds. These were located as follows: Face (lower jaw), 1; neck, 1; chest (right side) 1; abdomen, 2 (one over the crest of the left ilium and one through the left ilium between the middle curved line and the crest); arm, 1; forearm, 1; hand, 2; thigh, 10; leg, 4; foot, 3. This gives the number of patients, not the number of wounds. In two of the above injured in the thigh the patients also had gunshot wounds of the back. The patient wounded in the neck was also shot in the head. The latter wound was self-inflicted. The ball, a .32 caliber from a revolver, glanced from the right temple and passing for 2 inches around the frontal bone was found and extracted a few days later.

In four other instances, to be hereinafter mentioned, the patients suffered from more than one wound. In one case above enumerated of the foot the ball remained and could not be traced. This could hardly be called a flesh wound.

All of the above wounds but one were from the Mauser rifle. This, a wound of the thigh, was from a heavy caliber bullet. There were three cases in which the patient was shot in the chest, the bullet remaining, but giving no trouble. In one of these the external wound suppurated slightly, but healed in time, and the patient was again on duty in the fields twenty-two days after receiving the wound. In the other two there was no suppuration. These patients said that there had been no hæmoptysis. That the bullet should not have passed through the chest in any of these cases (they were all from the Mauser rifle) seems unusual considering its velocity.

There were 2 patients with abdominal wounds. Both of these were from the Mauser bullet. In one case the missile entered between the crest of the ilium and the twelfth rib, 3¾ inches to the right of the spinous processes of the lumbar vertebræ. Its point of exit was between the costal cartilages of the seventh and eighth ribs, 2 inches from the center of the sternum. This bullet must have passed through the liver, yet the patient made an excellent recovery, and two weeks after the injury was walking about the hospital. In the other case the bullet entered the inner extremity of the left gluteal fold, thus well internal to the tuberosity of the ischium, and was extracted from where it lay, subcutaneously, 2 inches to the right and below the umbilicus, a week later. This patient made a good recovery. Whether the ball passed through the abdomen or, striking the ramus of the ischium and pubes or the pubes, glanced upward can not be determined. There was abdominal pain and tenderness for some days. There must have been other cases of abdominal injury, but these probably died on the field.

There were 11 fractures from gunshot wounds. Six of these were from the Mauser bullet and 4 from the Spanish Remington. In one case the nature of the missile causing the fracture could not be determined. Three of these fractures involved joints, in one the knee-joint and in two the elbow joint. There were 2 fractures of the inferior maxilla. In one case this was due to a bullet that glanced from the symphysis, fracturing the bone just to the left of this. The left central and left lateral incisors could be noticeably separated, though crepitus could not be felt. The external wound was sloughing and the character of the missile inflicting the injury could not be determined. In the second case, that of a woman shot by accident, a large caliber bullet passed through the symphysis, shattered the bone badly, and came out at the left side of the back of the neck. An abscess formed in the track of the bullet at the side of the neck. This was in front of the sterno-mastoid muscle, below the angle of the jaw. Under an anæsthetic the loose fragments of bone were removed, the rough projecting edges rounded off (there was a loss of 2 inches of bone), the abscess opened, and a wick of iodoform gause drawn from the mouth along the track of the bullet out through the abscess cavity. This and the wound in the mouth were then packed with gauze. A quick convalescence followed, and when last seen, just before the patient was discharged from the hospital, a ridge of soft tissue had formed, replacing the bone in front. In all probability this tissue contained periosteum and the chances of a bony deposit and final bony union were excellent.

There were 2 fractures of the humerus. One of these was from the Mauser bullet; there was no comminution, and the patient was doing well when last seen. The other was from a heavy caliber bullet, and the upper part of the shaft of the bone was badly comminuted. There was an open sloughing wound on the inner side of the arm, involving nearly one-third of its circumference. The arm was amputated at the shoulder-joint, and the patient made a good recovery. This patient was also shot through the other arm by a Mauser rifle. The wound healed quickly without suppuration.

These cases afford an excellent example of the comparative effects of the two missiles on bone.

There were 2 cases of fracture of the ulna from Mauser bullets. Both were doing well when last seen.

There were 2 gunshot wounds of the elbow joint, both from the Mauser rifle. In each case the arm must have been half way between flexion and extension at the time of the injury. In both the bullet entered at the back of the joint, passed through the humerus, and out through the ulna. In both the wound of entrance was small and round; that of exit ragged and over 2 inches long. Both were badly comminuted. In both there was sloughing with a foul odor. Amputation above the elbow was performed in both cases. One of the patients made a good recovery. The other, besides the injury to the elbow, had a gunshot wound through the orbit. The bullet, a Mauser, entered an inch in front of the right external auditory meatus and, passing upward, forward, and inward through the orbit, emerged from the forehead just between the eyebrows. The wound of exit was a little larger than that of entrance. The eye was destroyed and there was profuse suppuration from the orbit. The remains of the eye were enucleated, and after carrying a small drainage tube from the wound of exit down to the orbit the cavity was packed with gauze. Drainage was made from the orbit to the wound entrance by means of a double silk thread, this being all the opening would accommodate. The operation was performed on June 5, at the same time the arm was amputated. The stump of the arm healed rapidly, but the eye did badly. The inflammation extended, the bone between the orbit and point of exit broke down, and the patient was almost unconscious and dying when removed on June 19. Death was due to pyæmia.

It may here be observed that although most of the wounds made by the Mauser bullet are clean perforations, with the point of exit little larger than that of entrance, should the missile meet with great resistance at its point it will in some instances turn over on its long axis, lose its axial rotation, and, plowing its way through the tissues, make a formidable wound, like or even worse than those so common from the old heavy-caliber bullet. As an instance may be cited the following case: A sentry at the gate of the Cavite Arsenal, who one night seeing what in the darkness appeared to be a man stealthily approaching, after hailing twice, fired. The object dropped, and on investigation it was found to be a goat. The bullet had entered its forehead, the hole being so small that it was difficult to find in the hair, but at the exit the greater part of the back of the animal's skull had been carried away. The bullet was from one of the new navy rifles. It has been said that a modern small-caliber bullet, with its great velocity, may pass through one of the long bones without breaking it. Search was made for such cases, but none were found of which there could be any certainty.

There were 2 cases of fracture of the femur in the hospital. In one, by a Mauser bullet, the missile had passed through the soft tissue and bone, breaking the latter, but without communition. The aperture of exit was no larger than that of entrance. Both healed without suppuration, and the case was doing well and the patient in excellent condition when last seen.

The other fracture was due to a larger caliber bullet. The bone was struck from behind, just below the trochanters. It was broken here and the shaft badly splintered. There were five pieces knocked off, the largest of which measured 5 inches. There was a large wound of exit, which sloughed. Amputation was performed at the hip joint, and the patient died twenty-seven hours later. In another fracture, by a heavy caliber bullet, of the upper extremity of the tibia, the bone was again badly comminuted. Suppuration followed, the knee joint became involved, and amputation was performed at the lower third of the thigh. In making a long antero-external flap a pocket of pus was cut through, and a quantity of the purulent fluid gushed out over the wound. The pus had burrowed up from the bursa above the patella, between the vastus externus and crureus muscles. The wound was cleansed and thoroughly irrigated with a 1 to 1,000 sublimate solution. That portion of the flap involved was cut off, and the other flap (it had not yet been cut out) lengthened to compensate. Only slight suppuration followed. The stump was doing well, and the patient's general condition was good, when last seen, six days after the operation.

Machete wounds.—Out of 11 of these patients, 7 had scalp wounds. One was wounded on the right chest, and 1 on the left forearm. One patient was wounded on the forehead, and in the middle of the right forearm, besides having a superficial gunshot wound of the right cheek. This was the only case in which there were any complications; the others, although they all suppurated, made quick recoveries. In this instance there was a secondary hemorrhage from the radial artery, ten days after the injury. This occurred early in the morning, and the attendants stuffed a piece of cotton, soaked in tincture of the chloride of iron, into the wound, then applied a compress, and bandaged the arm so tightly that the circulation was nearly stopped. When the case was examined in the afternoon, the arm, below the bandage, and hand were much swollen, and scarcely any pulse could be felt. The dressing was removed, the wound cleaned and slightly enlarged, and the artery tied. The following day a weak radial pulse, due to collateral circulation, could be felt. This patient made a good recovery. In 1 patient there was a clean amputation of the hand, through the carpal bones, by a blow from the machete. Amputation was performed just above the wrist joint, and, although there was some sloughing, the wound finally healed, and left a good stump. All of the machete wounds were simple incised wounds but one, a punctured wound on the right side. This was not deep and healed readily. The patient also had a scalp wound from the machete. These patients were all Spaniards.

Wounds from bursting shell.—There were 2 of these. Both patients had been struck on the chin, and the bone, from 2 to 3 inches from the angles of the jaw, reduced to splinters. The soft tissues were divided from the mouth almost to the hyoid bone. These sloughing flaps hung down on either side, exposing the mouth and tongue. These patients had lain four days in the field without treatment. The wounds were first thoroughly cleansed, the ragged tissue and splinters of bone removed, and the rough ends of the jaws filed down. The edges of the flaps were then fastened, brought together, and sutured. In one case they united readily, and when the patient was last seen a semicircular ridge of soft tissue had formed, connecting the broken ends of bone. There will probably be a bony union in time, as this tissue undoubtedly contained periosteum. In the other case there was a considerable loss of tissue and consequent tension of the flaps and an opening half an inch long was left at the front of the chin. This was remedied by a second operation. In this case the ends of bone were drawn together, forming an acute angle. In spite of this deformity the patient will still be able to masticate with the back teeth. The upper front teeth were knocked out by the same piece of shell that shattered the lower jaw.

There were only 2 deaths (already described) from wounds in the hospital during the time embraced in this report—that is, from June 1 to June 19, 1898.

Operations performed.—Amputation of arm below the shoulder joint, enucleation of eye, ligation of the radial at the middle of the forearm, by Asst. Surg. D. N. Carpenter.

Plastic operation on the mouth, amputation of forearm above the wrist, by P. A. Surg. R. G. Brodrick.

Plastic operation on the mouth, amputation at the shoulder joint, amputation of arm below the shoulder joint, amputation at the lower third of the thigh, by P. A. Surg. C. D. W. Brownell.

NOTES ON THE PREVALENCE OF SYPHILIS AND LEPROSY IN GUAM.

By B. R. Ward, *Passed Assistant Surgeon, United States Navy.*

Syphilis, especially in the tertiary forms, is very common in Guam. Its ravages have been terrible. People without noses, with lifeless gums, and gigantic loathsome ulcers are not unusual. Many of the cases rival the worst ravages of cancer, and those like them are only rarely seen in a hospital ward or skin clinic in a large city. The natives think little of the disease, and do not take any form of treatment.

The bodies of some of them are simply one putrescent pultaceous mass without recognizable features.

The greater part of the cases are tertiary, though a secondary form has been seen among the Spanish soldiers, and the primary also. I am inclined to believe that the large majority of the cases are hereditary, though I did not observe a sufficient number of children under 6 months, and young people, to form a positive opinion. However, in a few cases the lesions were present and in a number of children answered well to the usual description given to the disease.

I would urge that the United States Government take some active measures toward curing this disease in Guam, and I would earnestly recommend that, as there are no medicines here, large quantities of the salts of mercury and of the iodide of potassium be sent as soon as feasible, together with lint, bandages, etc., for dressings. I would estimate that in two years, or at the most three years time, a very large proportion of these cases could be cured and many much improved. A skillful doctor is also needed, for there is a large field for plastic surgery.

The cases noted and examined numbered seventy, but this does not by any means cover all that were seen, and even several without noses are not included in this number.

The shortness of our stay only allowed me to make a mere brief résumé of the subject, but nearly every form of tertiary syphilis described in the books came under my observation. As a rule, the nose, face, hard palate, and skin areas around the lower parts of legs suffered most from gummatous infiltration.

LEPROSY.

Leprosy is endemic in the island of Guam, and is by no means a rare disease. The natives have no fear of it, and in a case mentioned below, two marked lepers were living in the same house with three other persons not affected. The Spanish apparently tried segregation in a mild way. On the road from Piti, where boats land to Agana and about 2 miles up, there is situated a one-story stone building divided into two wards—one for men and one for women—which might possibly accommodate 20 patients. Connected with it is an outbuilding, which seems to have been in use as a kitchen, storage places, etc. Somewhat apart is a small native house, apparently for the superintendent of the place. These buildings are only surrounded by a bamboo fence on the roadside, and an entrance from behind would be most easy. Almost directly opposite the hospital is a small native village of some twenty huts or so. The natives seem to wander at will within the hospital premises. There was only one leper there; the rest, not more than four or five, having left of their own accord. No one appeared to be in charge of the place, and the leper had depended upon cocoanut trees in the yard and the charity of the natives in the village for his sustenance since the removal of the Spanish forces from the island. This place, from its nearness to a village and its location on a main highway, is obviously unsuited for the purpose. Twenty-two leper cases were observed during our stay here.

If in that short time—three weeks—so many cases were seen, and judging from the general practice of friends and relatives, in both civilized and uncivilized parts of the world, to secrete lepers, it is only natural to infer that there are in the island of Guam quite an appreciable number of cases. As segregation, so successfully practiced by the Hawaiians on Molokai, is at present the only apparent means known to check the spread of this dreadful affection, I would urge that some similar steps be taken by our own Government. An area in the northern part of the island, where there are few inhabitants, could be easily isolated, or, better, one of the neighboring uninhabited islands of the Ladrone group could be easily purchased and used as a leper settlement.

As Molokai at present furnishes all the features which are essential to a thoroughly equipped leper colony, it would be the best, though most expensive, way to transport all infected cases there without delay.

Leprosy here is of all forms—tubercular, anæsthetic, macular, and variously combined. Some cases are far advanced, others just at the initial stages.

SANITARY NOTES ON GIBARA, CUBA.

By F. L. Pleadwell, *Assistant Surgeon, United States Navy.*

Gibara is a small walled town situated on the northeast coast of Cuba, founded about 1817 as the port of entry and clearance for the city and district of Holguin. It is in railway communication with

Holguin, and by steamers is in biweekly communication with Havana and Santiago; once or twice a month a Munson Line steamer calls at the port.

The civil population of Gibara, including the small villages immediately surrounding of Santa Rosalia, Fray Benito, and Pueblo Nuevo, numbers about 5,000. During Spanish occupation a military force of about 3,000 men was stationed here.

Situated on the western slope of a small bay, the town extends east and west of a small peninsula which forms the western boundary of the harbor or bay. The ground on which the town is built rises gradually to form the hills of Vigia and El Catuco, situated behind and to the southward of the town. Nearly all the town, therefore, is built on the side of a hill whose slope is toward the sea, and faces the north and east. The town, therefore, has an exposure which permits of the full influence of the prevailing winds, a point of considerable influence on its salubrity. The surrounding country is hilly, except that portion drained by two small streams, the rivers Gibara and Cacuyugüin, where, in the rainy season, the low land immediately surrounding is often inundated and turned into a swamp or marsh. The rivers abovementioned empty into the bay just to the eastward of the town. They are shallow streams with muddy waters, generally ladened with vegetable refuse.

The prevailing winds are easterly, the easterly trades, and occasionally shift to the northeast or southeast. They are present up to the end of September and then die out, with succeeding warmer weather.

During the ship's stay in this port, a period of seventy-five days, from the end of July to the middle of October, the average mean temperature has been about 74° F.

Noticeable pollution of the air from offensive trades has not been present to any marked degree. The public slaughter-house is situated at the western limit of the town, on the shore line, and extending out over the water. The refuse is dumped into the sea.

At the eastern end of the town, just inside the wall, is a tannery, but its situation is such that at present it does not prove a nuisance.

WATER SUPPLY.

The town depends almost entirely upon the rainfall for its water supply. All houses are so built that the rain falling upon the roofs is collected and led into cisterns. The river water is excessively muddy and can not be used even for washing. Sunken wells are brackish and undoubtedly subject to contamination. Many years ago it was proposed to bring water from an inland stream to the town by means of an aqueduct, but the idea has not been carried out. The rain-water supply seems adequate for the present demands of drinking and washing, but for uses besides these would undoubtedly fail. As to the quality of the water, when the cisterns are well made, outside of the drainage area of cesspools, with frequent cleaning, the water is potable and good. In many instances these conditions were found not to exist, and the water in consequence was unfit for use. There is no ice except that which is brought by steamer from Havana. There is contemplated the installation of an artificial-ice plant, to be run in connection with the electric-light plant.

FOOD SUPPLY.

Prior to the recent departure of the Spaniards all cattle remaining in the town and surrounding country were driven in and levied upon for the use of the military forces, and later taken to Holguin. This accounts for the present scarcity of meat, and what there is is mainly bull beef, tough and unpalatable, but eagerly sought after and in great demand by the native Cubans. An order has been issued by the Cuban military commander that no milch cows shall be slaughtered. Outside of the town in the distant country cattle are more plentiful, as here they were more securely hidden from the Spaniards. Fish are plentiful the year round, and are caught just outside the harbor.

The banana is the chief fruit, this section of the country being the center of banana production, and this port the one from which all fruit steamers clear. Other fruits, like the avocado, mango, and custard apple, are less abundant than on the south coast.

Of alcoholic drinks, rum, produced from the distillation of the products of the sugar cane, is the most popular and is widely used, though not to excess.

SOIL.

The soil is composed of a calcareous marl superficially, but at a depth of a few feet it becomes a gravelly clay, and deeper still, at the coast line, the bed rock of limestone is met with.

As before mentioned, the town is mainly built on the side of a hill whose slope is toward the north and east, the streets of the town running up and down the hill. The angle of slope is considerable, and hence offers good conditions for natural drainage. In the western precincts of the town the ground becomes more level and correspondingly more foul from the accumulation of surface and drainage water. As is the custom in countries settled by the Spaniards, all large trees have been cut down, and even outside the town wall the underbrush and trees have been cut away, in the latter instance, perhaps, that they might not offer protection to or conceal the Cuban insurgents.

DISPOSAL OF SEWAGE AND REFUSE.

The methods in vogue for the disposal of sewage and refuse are primitive and insanitary. Nearly all the houses have vaults, poorly made, badly situated, and seldom cleaned, into which is placed most of the solid refuse. These vaults are rarely ventilated in any other way than into the living rooms of the dwelling. Liquid sewage and wash water is led by a drain under the sidewalk, and opens into the street to seek its level at some other spot, or remain and prove a nuisance and a menace to health. In those sections where the ground is level and no natural drainage exists, pools of stagnant water, arising from this source, are not infrequent. Fortunately, most of the streets have such an angle of slope toward the sea that liquid refuse does not collect in this way, but gravitates to a lower level and finally empties into the sea.

HARBOR.

The harbor not being inclosed to any great extent is generally well flushed, and is free from sewage from the town. At certain stages of the tide its waters become very muddy and filled with vegetable refuse from the rivers Gibara and Cacuyugüin.

HABITATIONS.

The houses of the better classes are built of stone and mortar, one-storied, with high windows and doors, the ground floor being laid directly on the ground or soil. The poorer classes live on the outskirts of the town in rude shacks built of palm leaves and thatched with straw. In these the people live directly on the ground, and are subjected to partial inundation whenever it rains.

A small building in the fort inclosure is used as a prison. The accommodations for prisoners are very poor and very insanitary, being dark and ill ventilated, and incapable of holding more than five or six without crowding. Military prisoners are being kept in the Cuban cuartel. The cuartel contains most of the Cubans at present quartered in the town. It is centrally located, and from its condition is a menace to the health of the residential portion immediately surrounding it. The Spanish cuartel or barracks accommodated but a portion of the Spanish force formerly here, many being quartered in the town, and was situated outside the wall in that district called Pueblo Nuevo. It is a wooden thatched building, poorly constructed, and with no accommodations, and of little value except to break the force of the wind and rain. It is at present unoccupied, but upon the occupation of the town by the United States Army it was turned into a temporary hospital for the isolation and treatment of smallpox.

HOSPITALS.

At present there are three hospitals in the town and the establishment of still another is contemplated.

The Cuban military hospital has been established to care for the wounded and sick of the Cuban force in this district, but is open to any sick who may apply for treatment. Its accommodations, however, are limited, and nearly all materials have been improvised by the Cuban surgeons in charge. Its principal occupants at present are the Cubans who were wounded in a recent skirmish with the Spaniards, near Auras. One or two Americans, stragglers from an expedition, are under treatment for malarial fever. The resources of this hospital are very limited and it is now in great need of food and medicine.

The Spanish military hospital is the most pretentious and at one time was made to accommodate 700 Spanish sick. Its normal capacity is 500 beds. The building which goes under this name was originally intended for a public administration building, but was seized by the Spaniards to be used as a hospital. It is a large rectangular-shaped building, with an inclosed court, three sides of which are made up of single-storied wards, the remaining side being two-storied and containing quarters for the administrator and apothecary, with their offices, and an office for the surgeon in charge. All the wards open on to the open court, containing recreation grounds and the cistern. The wards are fitted with frame canvas cots, the floors being wooden and the walls of rough boards whitewashed. Almost no sanitary facilities are offered, and the entire building is foul with human refuse. The water-closets are so placed on the windward side of the whole structure that a general pollution of the grounds and wards is unavoidable.

The cistern water is contaminated and unfit for drinking purposes.

The hospital is well equipped with instruments of good make, with abundant surgical supplies and with an ample amount of medicine.

A municipal hospital[1] of 80 beds is under construction for the isolation and treatment of smallpox. It is situated on the crest of the hill overlooking the town.

A general municipal hospital is under consideration, to be under municipal control, for the treatment of the poor of the town.

BOARD OF HEALTH.

As constituted, the board of health consists of the mayor, the city physician, the captain of the port, and the collector of the port.

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[1] This hospital was not acceptable to the United States Army and was abolished.

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REPORT

OF THE

SURGEON-GENERAL, U. S. NAVY,

CHIEF OF THE BUREAU OF MEDICINE AND SURGERY,

TO THE

SECRETARY OF THE NAVY.

1900.

WASHINGTON:
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1900.

REPORT

OF THE

SURGEON-GENERAL, U. S. NAVY.

Department of the Navy,
Bureau of Medicine and Surgery,
Washington, D. C., October 1, 1900.

Sir: In obedience to instructions contained in Department's letter of July 11, 1900, I have the honor to report the operations of this Bureau for the past year, accompanied by a set of annual estimates for the fiscal year ending June 30, 1902, and a statistical report showing the health of the Navy for the year 1899. The report embraces a statement of the condition of the naval hospital fund, the naval medical establishment, and other matters of interest pertaining to the duties of the Bureau of Medicine and Surgery.

A large proportion of the naval force has for the past year been employed on the Asiatic Station, principally about the Philippines. Considering the climatic conditions and the necessary exposure, the health of this squadron has been remarkably good. It has been and still is the practice to send officers and men who are suffering from debilitating climatic conditions to the naval hospital at Yokohama, where, as a rule, they soon recover and return to their stations for duty. This has at times overtaxed the capacity of the hospital, and the senior medical officer was given authority to engage additional accommodations, whenever necessary, at any hospital, hotel, or other place. The necessity for this will soon cease to exist, as the Department authorized the expenditure of $20,000 for additional hospital accommodations, which authorization was cabled to Yokohama, and the work has already been commenced according to plans previously prepared.

The naval hospital at Cavite has been more thoroughly equipped, and is now able to properly care for such cases as may be transferred to it until plans are prepared for a larger and more modern hospital.

The new naval hospital at Mare Island is now occupied and in every respect meets the requirements of officers and men transferred from the Asiatic Station for longer treatment than would be feasible on that station, or treatment preparatory to discharge from the service.

Temporary hospitals were established at Taku and at Tien Tsin at the time of the advance of the allies on Pekin, and the patients from those hospitals subsequently transferred to the *Solace*, which vessel has sustained her reputation of always being where she is needed. Sixty army wounded were also transferred to the *Solace*; 57 were transferred to the *Thomas* at Nagasaki, and 3 of the more serious cases were left at the naval hospital, Yokohama.

Fleet-Surgeon Persons took to Taku a large stock of surgical supplies, and an additional amount is now on the *Arethusa* en route.

The Bureau has not yet received the report of Assistant Surgeon Lippitt, who was with the marine guard at Pekin during the bombardment. He is reported to have been wounded.

Reports received from Guam indicate improved sanitary conditions. The natives are being taught to properly care for themselves, and it is hoped that they will soon have a self-supporting hospital at Agana. Meanwhile they continue to receive medical attendance and medicines from the medical officer of the *Yosemite.*

The natives at Pago Pago receive such medical attendance and medicines from the medical officer of the *Abarenda* as circumstances permit.

The hospital facilities at San Juan, Porto Rico, have been ample, and there has been very little sickness at the station.

An epidemic of yellow fever appeared at the Havana naval station in August, and all the station force not absolutely required there were sent to New York, Assistant Surgeon Marcour being left in charge.

The Bureau regrets its inability to proceed with the erection of an addition to the naval hospital at Newport. The bids received were in excess of the appropriation. An additional appropriation has been asked for, which, if granted, will enable the Bureau to add the hospital accommodations that are absolutely necessary for the growing requirements of the training station.

The Hospital Corps organization has now reached a standard of efficiency enabling the Bureau to make all appointments of hospital stewards from hospital apprentices, first class, by examination and promotion. It is regretted that the enlistments of hospital apprentices are not as yet sufficient to enable the Bureau to keep as large classes as are desired at the larger naval hospitals for instruction.

There are now seventeen vacancies in the list of assistant surgeons, but it is hoped that these vacancies will be filled so soon as it is generally known that recent legislation gave assistant surgeons in the Navy the same rank as assistant surgeons in the Army. During the past year the Bureau has supplied ten of the larger naval hospitals with libraries of 365 volumes each. The books were carefully selected and are very much appreciated by the patients.

The medical officers of the Navy have maintained their standard of efficiency. They have been constantly employed and very few have during the past year been able to obtain the customary leave, even during the summer months.

NAVAL HOSPITAL FUND.

The condition of this fund is as follows:

Balance on hand July 1, 1899	$135, 217. 64
Transferred to the credit since July 1, 1899	150, 116. 28
Credit by appropriation for fiscal year 1900	30, 000. 00
	315, 333. 92
Expended since July 1, 1899	137, 334. 29
Balance on hand June 30, 1900	177, 999. 63

ESTIMATES.

In addition to the sums annually appropriated by Congress, an estimate has been submitted for the following work:

Naval hospital, Newport, R. I.—"Filling pond, grading grounds, and additional appropriation for addition to naval hospital at naval training station, Newport, R. I., $20,000, to be immediately available."

Twenty thousand dollars was appropriated by act approved June 7, 1900, for "addition to the naval hospital at naval training station, Newport, R. I." Plans were drawn and specifications made for the addition, which was found to be more comprehensive than originally intended, and necessitated grading grounds and filling in a pond, as well as supplying a complete heating and laundry plant for the old as well as the new building. The lowest bid for the work was over $30,000, which did not include any grading or filling the pond. The additional appropriation is asked for to properly complete the work. It is also requested that it be made immediately available, so as to have the hospital ready as soon as possible after the completion of the new quarters for apprentices.

GENERAL REPAIRS AT NAVAL HOSPITALS.

Naval hospital, Widows Island, Maine.—Repairs on this hospital have been of a minor character. The verandas have been painted and the work on the wharf, mentioned in the report of last year, has been completed. The boat shed which was injured during the winter has been reroofed and the southern chimneys of the hospital cemented and painted.

This island was acquired by the Government for light-house purposes, but as it was ultimately decided not to utilize it in accordance with the original idea, it was transferred to the Navy Department when in 1885 the Isthmus of Panama was the scene of considerable naval activity. The presence of so many of our ships in that part of the world induced the idea that it would be wise to provide a suitable refuge for infected vessels. A temporary wooden building was constructed at that time. The present permanent structure was begun in June, 1887, and completed the following February. At the same time the island was much improved, a water supply provided, a wharf built, and portable Ducker hospitals supplied to be utilized in connection with the main building, intended mainly for administrative purposes. Thus for fifteen years this locality has been set apart for a special purpose for which it has never been employed, as in the meantime the facilities at the various quarantine stations have been greatly increased and the appliances for the disinfection of vessels much improved. In view of the very slight probability that the necessity for the use of this hospital will ever arise, only such repairs are made as will preserve the building and grounds until they can satisfactorily be disposed of by the Government.

Naval hospital, Portsmouth, N. H.—During the year this hospital has been supplied with a new outfit of surgical instruments and an X-ray apparatus. New shades have been placed at all windows, and a steam pipe has been laid to each bath tub, thus securing for bathing purposes an abundant supply of hot water whenever it may be desired. Water and steam heat were introduced into the stable, and repairs were made to the boilers. As the two pavilion frame wards erected in 1898 for the accommodation of the sick Spanish prisoners remained in such good condition, they were shingled during the year and are now, at relatively small expense, still useful buildings.

Naval hospital, Chelsea, Mass.—The following improvements and repairs have been made at this hospital during the year: The steam boilers have been retubed and repairs have been made to ranges, waterpipes, closets, lavatories, and drains. Rubble has been placed at the foot of the sea wall, and the barn, building for contagious diseases, gatehouse, laundry, boiler house, and mortuary have been painted. Extensive repairs have been made to the hothouse and to walks and fences, and the isolation building has been supplied with window and door screens and new base-burning stoves. The equipment of the hospital has been greatly improved in furniture, bedding, surgical instruments and appliances, and in facilities for the use of water in reducing temperature in continued fevers. Additional surgical dressing stands, a new surgical cabinet, and portable bath tubs have been supplied.

The cemetery has been greatly improved, and when the headstones, which will soon be received, have replaced all wooden and iron crosses, this feature of the ground will present a much more satisfactory appearance than it ever has. The work has consisted in grading and draining, sodding, planting many trees and shrubs, placing gravel on the roads, and supplying a new fence.

Naval hospital, Newport, R. I.—As stated in the report of last year, this hospital, though comparatively new, requires more or less constant care to retain it in serviceable condition. This work, as a rule, consists in a large number of minor repairs, but during the past year these were less frequent than usual, as it was expected that the building of the addition provided for in the last act making appropriations for the naval service, would minimize many of the deficiencies of the present building, and, by providing additional quarters, facilitate work on the wards and rooms now too small to meet the requirements of the station. Improvements were, however, made in the floors of the two wards of the main building, library, dining room, main corridor, nurses' rooms, and small corridors and rooms opening into them. The furnace was repaired, and storm sashes with sliding wickets were provided for the isolation building. New shades were furnished for all windows of the main building, and cabinets for medicines in daily use in the wards were placed in the nurses' rooms.

In the grounds bare places were turfed and the hedges trimmed. Gravel was placed in the road about the hospital, and the lawn was improved by planting seed and rolling.

Naval hospital, New York.—The improvements at this hospital during the year have been chiefly made in the grounds, and have consisted for the most part in changes in the inclosing wall, and in the roads, walks, and cemetery. The work of rehabilitating the hospital itself was practically completed during the previous year, with the exception of installing new boilers, and therefore additional improvements in the buildings during the past year have been of a minor character. Congress in the last act making appropriations for the naval service provided $5,000 for installing two new boilers. This work is now being done under the direction and supervision of the Bureau of Steam Engineering, and will be completed in a few weeks.

Over 1,000 feet of coping were reset on the walls of the grounds, and the stone wall of north and west boundary was repointed, a portion of the old wall adjoining the creek rebuilt, and much general repair work done. A kaidamant walk was laid in front of the laboratory and around the hosiptal, and 600 feet of curbing were reset. A vitrified-brick roadway around the hospital has been completed, and additional hydrants with connections for fire purposes are being supplied. In the cemetery the iron markers were removed and 450 headstones placed and the ground sodded.

In the north end of the main building the closets and bathrooms had their connections with the main sewer renewed with a new 6-inch iron pipe. Repairs were also made to the brick chimney of the steam boilers, vitrified wall coping bedded in cement having been placed, pointing done inside and out, and three coats of paint applied.

During the year a number of cases of scarlet fever, measles, and typhoid fever were treated without a fatal result. The cases of scarlet fever and measles were principally among apprentices. Operations for the radical cure of hernia by the Bassini method have given good results, and ten such cases were returned to duty.

Naval hospital, Philadelphia, Pa.—The improvements and repairs at this hospital during the year have been for the most part of a minor character. In the engine department steam pipes and boilers were supplied with magnesia covering, the boilers were scaled, and two additional radiators installed. A concrete and cement pavement was also laid around the engine house, a fire gong was placed, and a considerable number of fire pails supplied. Gas fixtures were repaired and a new range was installed. Corridors, stairways, and an upper south ward were painted, greenhouse was repaired, and coal sheds were sheathed inside. The quarters of the medical officer in charge were connected by telephone with the hospital building.

Naval hospital, Washington, D. C.—The capacity of this hospital has been practically increased during the year by improving one side of the attic story and fitting it for the receipt of patients when the lower wards are filled. This new ward is well supplied with windows, and is therefore well lighted and ventilated. It has floor space for at least twelve beds, and being situated at the top of the hospital, has, in the absence of an isolation building, a distinct value in segregating cases of contagious disease.

The plumbing in bathrooms has been removed and more modern plumbing installed; the floors in these rooms and walls up to the windows have been tiled, and in the attic and basement, water-closets have been placed. Hand grĕnades and fire extinguishers have been more prominently placed on the various floors, and a valve has been put in the pipe leading from the steam pump that steam force may be used to throw water in case of fire. Steam connection has also been made with each wash tray in the laundry, so that now the boiling of clothes can be accomplished rapidly and with no additional labor. Numerous additional repairs and improvements of a minor character were made in the steam, hot and cold water, and drainage systems.

The condition of the streets of the city (Ninth and E) adjacent to the hospital continues to be unsatisfactory, as the noise of vehicles disturbs patients greatly and the dust at times is very objectionable.

There has been a marked diminution in the number of cases of contagious diseases admitted to this hospital during the year, but there were 17 cases of remittent fever and 35 cases of intermittent fever received from the Washington yard and marine headquarters. They all yielded to the proper administration of quinine, but the reappearance of the disease among those returned to duty at the navy-yard was very frequent.

In the laboratory of the hospital bacteriological examinations are made systematically and their importance is increased by the malarial influences to which nearly all patients have been subjected. In this way an early diagnosis was practicable in the four cases of typhoid fever received during the year. All the cases gave the Widal reaction, though the fever was for some time of a remittent type. One exhibited a distinct malarial infection just as convalescence seemed established.

The X-ray apparatus was employed with much satisfaction in a number of cases, but with especially interesting results in two cases of fracture around the shoulder joint. In one there was a fracture of the acromion process of the scapula, with subluxation of the acromial end of the clavicle. In the other the acromial end of the clavicle was fractured and dislocated upward.

Naval hospital, Norfolk, Va.—The grounds of this hospital have an area of about 70 acres, of which about 20 acres are lawn. The roads are about 6 miles in length and the beaches about 1 mile. During the year stone and shells were put on 4,000 feet of road and 6,000 feet were reshelled. The work of keeping the grounds in order has continued, and in spite of its magnitude they present a very good appearance. Three hundred and fifty feet of sea wall destroyed by storm have been rebuilt, and 10,330 feet of sewer have been laid from the isolation building, where also water has been supplied and closet and bath installed. Five hundred feet of brick pavement have been raised and relaid, the cold-storage room rebuilt, new fire mains put in, new smokestack to boilers put up, the hospital and boiler-house roof repainted, and two boilers retubed. The tool house has been thoroughly repaired and the electric light extended to the stable. Corrugated rubber matting has been laid in the wards and corridors of the hospital, and an X-ray apparatus has been supplied.

Naval hospital, Port Royal, S. C.—During the year several improvements were made at this hospital. In the rear of the eastern ward an addition was built and fitted as an operating room, with the usual instruments and appliances. The two wards were ceiled with strips of pine, and one divided by a partition to provide separate accommodations for sick officers. This room, containing fireplace and mantel, has been completely furnished and presents a very comfortable appearance. Each ward has been supplied with a ventilator, and outside blinds have been placed on all the windows. Shelving for books and periodicals has been put up, a storeroom has been added sufficiently large to hold all reserve medical and surgical stores, and a coal bin has been built in the rear of the kitchen capable of holding the supply of coal for the year.

These changes have greatly increased the efficiency and comfort of this hospital, and admirably fitted it for the limited requirements of the station.

Naval hospital, Pensacola, Fla.—The following improvements and repairs were made at this hospital during the year: The building was painted inside and out, and all floors were shell-laced. The walls of the grounds were repaired and whitewashed, and the gates repaired and painted. The terraces and curbings were repaired, and in some places buttresses were built to provide additional supports. All outbuildings have been placed in good condition and whitewashed, and 1,000 cubic yards of débris of old buildings removed from the grounds and used in the construction of a good road between the hospital and navy-yard. Vistas were opened between the hospital and bay, not only providing a fine view for miles in three directions, but also permitting the breeze from the gulf to reach the building. A flagstaff has been erected and a suitable simple fountain has been installed. Minor repairs were made to laundry building, mortuary, and stable, and in the waterworks plant pipes broken during an unusually cold winter were renewed. Repairs were also made to gutters and cistern leads, and all wards were supplied with screens.

These changes have made a great improvement in the appearance of the hospital and grounds, and have been necessary to preserve the property and keep it in condition for efficient service.

Naval hospital, Mare Island, Cal.—During the year 1899 the portion of the marine barracks described in the report of last year continued to be utilized for hospital purposes pending the construction of the new building, necessitated by the destruction of the old hospital by earthquake on March 30, 1898. The provisions made at that time for the treatment of the sick were merely of a temporary character, but they were sufficiently complete to meet the emergency, though not without disadvantages. The naval hospital on this coast is necessarily one of much importance, and its destruction was a loss that could not be entirely supplied by any means immediately available. However, by the use of the marine barracks, the building of a large temporary frame structure for offices, storehouse, and dispensary, and the continued employment of outbuildings, laundry, steam-heating plant, etc., much efficient work has been done during the year and a considerable degree of comfort secured for all patients. In the meantime the work of constructing the new building, for which contract had been made without delay, was hastened as much as possible; and on April 3, 1900, the new hospital was accepted and immediately placed in commission. The new building is a modern hospital in design and equipment, and is thoroughly adapted to meet the requirements of the station to which many of the sick and injured from the force in the East are ultimately transferred, as well as those from our fleet on the Pacific coast. Since the hospital was accepted from the contractor new bedsteads, mattresses, and rugs have been supplied, shades have been placed at all windows, and as the water pressure was found to be insufficient to fill the storage tank a pump for that purpose has been installed in the basement.

Naval hospital, Sitka, Alaska.—The naval hospital here would be more properly called sick quarters, as patients are treated in a part of the naval storehouse, three rooms being set apart for that purpose. The building is the only one available, and the three rooms are situated at an end of the third story. One only can be used as a ward, as one has to be employed as a kitchen, and one as a dispensary, office, and operating room. The ward is small, but has been made as comfortable as circumstances permit. The building rests on piles and huge bowlders and extends out over the water a distance of about 125 feet. High winds cause an easily perceptible motion. Under the circumstances only minor repairs have been made during the year, as it is impracticable to place the present old building in a reasonable condition. It is true that the force here is a small one and the health of the men is generally good, but if the station is to be permanently occupied better accommodation should be provided for the sick.

Naval hospital, Yokohama, Japan.—Owing to the structural character of this building, age, ordinary wear, and more or less damage from storms necessitate a constant renewal of woodwork and plastering. All the buildings on the compound have been painted on the outside and the roofs coal tarred. An improvement has been made in the erection of a detached mortuary with proper facilities. All water for drinking and cooking purposes at this hospital is rain water stored in iron tanks. For drinking this is boiled and filtered before using. Water for bathing and washing is obtained from a deep well. The supply has always been sufficient, but the absence of running water and the facilities for heating it in quantity constitute a marked defect in a building used for hospital purposes. It is the declared intention to ultimately extend the water system of the settlement to the bluff, but as yet little progress has been made in that direction. It is therefore probable that a pump will eventually be installed to do the work required, especially as increased accommodations for the sick of the Asiatic Station are imperative, and arrangements have been made for erecting additional buildings. This new work will remove many of the defects now existing, as it will not only provide the additional space required for the increased number of sick incident to the large naval force on the station, but also space for heating, lighting, and disinfecting plants, and for suitable laundry facilities.

Naval hospital, Cavite, P. I.—This hospital, which was established in 1899 under the circumstances mentioned in the report of last year, was rapidly prepared and equipped and has been an important base for the sick of the station. The original supplies sent out by the *Solace* have been supplemented during the year by a variety of stores, including fifty bedsteads.

The selection of the storehouse and adjoining building within the yard, and the designing, repairing, and fitting them for hospital purposes have been more than justified by subsequent events, and though a percentage of the sick is transferred to the naval hospital at Yokohama on account of advantages derived from differences in climate, the hospital facilities at Cavite have been a necessity and have contributed greatly to the efficiency of the fleet and station. The first patients were admitted on March 29, 1899, and during the 278 days of the year the hospital was in commission 330 cases were under treatment. The total number of sick days was 8,362. Of the number treated, 211 were discharged to duty, 78 transferred to the Yokohama hospital or naval hospitals in the United States, and 10 were invalided from the service. There were 7 deaths. Among the cases there were 43 of gunshot wounds, 25 of simple continued fever, 32 of malarial diseases, 19 of dysentery, 2 of intestinal catarrh, 4 of simple diarrhea, 11 of typhoid fever, 6 of dengue, 12 of measles, 15 of rheumatism, 5 each of pneumonia and tuberculosis, 3 of pleurisy, 4 of bronchitis, 8 of heart trouble, and 62 of venereal and genito-urinary diseases. The history of this hospital has been followed with much interest, for its increasing importance indicates that if plans for a suitable naval station in the Philippines should be formed, it will necessarily include the construction of carefully designed buildings for the care of the sick, who so often require continued treatment at the station before being returned to duty or transferred on account of the better climatic conditions at Yokohama. During the present period, in which the general needs of the service in those waters have remained under consideration, it has been only practicable to utilize for the sick the quarters at hand and available. The wards have been carefully prepared and supplied with the usual furniture, a dispensary and an operating room equipped, and a dining room, kitchen, bathroom, laundry, and other essentials provided. Rooms were fitted for sick officers and quarters provided for medical officers on duty. The administrative part of the building was readily arranged, and the work of improvement and repairs has progressed until there is a general appearance of cleanliness, comfort, and efficiency.

SPECIAL AND CONTEMPLATED IMPROVEMENTS AND REPAIRS AT NAVAL HOSPITALS.

Naval hospital, Chelsea, Mass.—Provision for renovating and enlarging this hospital was contained in the act making appropriations for the naval service for the fiscal year ending June 30, 1900. After plans and specifications had been prepared by the civil engineer attached to the Boston Navy-Yard, advertisement was made on April 18, 1900, for bids, sealed proposals to be received at this Bureau until 1 p. m., May 10,1900.

The following proposals were received:

Connery & Wentworth, 30 Pemberton square, Boston	$35,500
L. D. Willcut & Son, 166 Devonshire street, Boston	34,232
Angus MacDonald, 95 Milk street, Boston	31,696
Conners Brothers, 16 Thorndike street, Lowell, Mass	30,170
Charles H. Dodge Construction Company, 23 Common street, Boston	28,960

The contract was awarded to the Charles H. Dodge Construction Company May 24, 1900, for the sum of $28,960. The work was commenced within ten days following the notice to the contractor on June 4, 1900, and it is expected that the contract will be completed in all respects before the middle of December next. The work is extensive, has been carefully planned, and will be executed under the supervision of the civil engineer of the Boston Navy-Yard. When it is completed this hospital will have been enlarged, thoroughly renovated, and supplied with every facility for the care of the sick and injured.

Naval hospital, Newport, R. I.—In the act making appropriations for the naval service for the fiscal year ending June 30, 1901, there is an appropriation of $20,000 for an addition to this hospital. Plans and specifications were prepared for such an addition as is necessary to accommodate the sick of the rapidly increasing number of apprentices at the station. A careful calculation was made of the additional space required, and the design was made under that limitation. The plans contemplated an extension of the present building in the most economical form consistent with approved ideas of hospital construction. The work was advertised for on July 2, 1900, proposals to be received at the Bureau until 1 p. m., July 30, 1900. The proposals were all in excess of the appropriation, and as the necessity for a suitable hospital at this station is very apparent and urgent, the additional amount required to carry out the work in accordance with the plans and specifications prepared is an item to be made immediately available in the Bureau's estimates of appropriations for the next fiscal year.

Naval hospital, New York, N. Y.—Congress, making appropriations for the naval service for the fiscal year ending June 30, 1901, provided $5,000 for removing old boilers, condemned as worn out and worthless, and furnishing and installing two new boilers at this hospital. This work is now nearing completion under the direction of the Bureau of Steam Engineering and will complete the rehabilitation of this hospital inaugurated several years ago by the Bureau.

Naval hospital, Mare Island, Cal.—The circumstances under which the hospital completed in 1870 was destroyed on March 30, 1898, have been fully referred to in previous reports. The contract for the present building was awarded without delay after the preparation of plans and specifications for a thoroughly modern hospital and, the work having been completed, the building was accepted on April 3, 1900, and immediately placed in order for the reception of patients. The part of the marine barracks that had been utilized for the sick was relinquished after a useful occupation of some months and all patients transferred to the new hospital, which consists of a central structure and two wings, all entering their full length into the formation of the front. The wings are pavilions, each about 71 feet long and 28 feet deep, containing the wards and having transverse projections at each end, in which are nurses' rooms, bathrooms, and water-closets. The nurses' rooms are at the ends of the wards next to the central structure and are well arranged. The pavilions have two stories and a basement, and the central structure, the administration portion chiefly, has an additional story with attic. This central structure occupies about 88 feet of the front and has a depth of about 64 feet. This does not include its further extension in an addition of equal height and having an area of 37 by 60 feet. In this addition are, in the basement, storerooms, smoking room, water-closet, and space for kitchen fuel; on the first floor, general mess hall, kitchen, pantry, and attendants' mess room; on the second floor, chapel, dispensary, bacteriological room, etherizing room, operating room, and recovery room, and on the third floor, eight bedrooms with all conveniences. In the main or central portion are the administration offices, quarters for resident medical officers and for sick officers, reception rooms, officers' mess room, library, and reading room. The wards are well supplied with windows on each side, those on the front of the building opening on broad piazzas. They will accommodate twenty beds each, but in an emergency the number can be greatly increased.

The building is of wood-frame construction of the most substantial character. All the framing lumber is of Oregon or Puget Sound pine, and the finishing lumber on the interior and exterior is of California redwood. The basement story is built of brick, stuccoed and roughcast with Portland cement, sand, and gravel. The entire building is heated by low-pressure steam from boilers outside the building. Two 42-inch Blackman fans are placed in the basement of each wing. These fans are operated by direct-connected motors of 1 horsepower each and are connected with galvanized-iron ventilating pipes ending in registers under each bed. The discharge ducts and flues are 25 per cent larger than the down-draft flues entering them. The entire building is lighted by electricity, and the passenger elevator is also electric, designed to lift a net load of 1,000 pounds and to have a speed to level of second floor of 100 feet per minute. A modern and extensive system of plumbing is provided, and the building is piped and fitted for gas. The water pipes, fixtures, water-closets, bath tubs, wash basins, sinks, discharge pipes, and sewers are all of good quality, well arranged, and of sufficient number. The entire hospital has been carefully planned and constructed and is thoroughly modern in building and equipment. The present boiler house and boilers are however old and beyond repair. This building was originally situated in a ravine, which has now been filled, leaving the site lower than the surrounding land and interfering seriously with drainage. In the act making appropriations for the naval service for the fiscal year ending June 30, 1901, an appropriation of $10,000 was made for new boiler house, boilers, and equipment. Plans and specifications for the work were prepared by the civil engineer attached to the Mare Island yard, and advertisement was then made on July 2, 1900, for sealed proposals to be received at this Bureau until 1 p. m. July 30, 1900. In the absence of bids, the work has been undertaken by the civil engineer of the yard, acting with the approval of the Bureau of Yards and Docks. The foundation up to floor level will be of concrete or cement mortar, and all exterior walls above floor level of brickwork. The steel roof frame will be provided to carry terra-cotta roofing tile. The chimney will be of steel, and two 45-horsepower horizontal tubular boilers with fixed domes will be installed. Sewer connection will be made and a brick conduit constructed to connect with the conduit now in use, and carry a 4-inch wrought-iron steam main, 2-inch wrought-iron steam return, and 2-inch galvanized wrought-iron hot-water pipe. The steam main and hot-water pipes are to be protected with magnesia sectional pipe covering. It is expected that the work will be completed in a few months.

Naval hospital, Yokohama, Japan.—The situation on the Asiatic Station, incident to the recent disturbances in China, emphasized the necessity for increased hospital accommodations for the sick and injured on that station. The present hospital has accommodations for 4 officers and 33 men, and the extension of our interests in the East, requiring the presence of a large squadron, has kept the wards filled and made it necessary to send to the United States patients who might be cured on the station and returned to duty, thus incurring great expense and losing their services. So long as the status incident to cruising in the waters of the Philippine Islands was unchanged it was practicable to continue existing arrangements until a Congressional appropriation could be obtained at the next session and the present hospital enlarged. The engagements in China, however, created an immediate emergency, as the wounded were necessarily transferred to the hospital at Yokohama, from which, in order to prepare for their reception, all patients who would bear transportation had been transferred to Mare Island, and, in addition, such suitable accommodations secured outside as circumstances would permit. In view of all the circumstances, urgent representations were made by the Bureau to the Department, which authorized the expenditure of $20,000 for building an addition to and furnishing additional accommodations at the naval hospital, Yokohama, Japan. As the question of this extension had been considered for some time and the general plans arranged, it was practicable to give directions for the work by cable on July 30, 1900. It is expected that the new building, constructed in accordance with the requirements of that locality, will be completed in a short time.

NAVY-YARDS.

Navy-yard, Portsmouth, N. H.—The general health of this yard during the year 1899 has been excellent, though in the first quarter epidemic catarrh prevailed to some extent, there having been 14 admissions with that disease. The total number of admissions was, however, small, and there were no deaths. Among the cases transferred to hospital were three of acute articular rheumatism and one each of tonsilitis and influenza. None of the others seems to have had relation to local or climatic causes.

The new dispensary was not completed during the year and still remains unfinished; and as the wings of the old building were removed, only the central structure has been available for the emergency medical and surgical work required within the yard. The new building has, however, been nearly finished in accordance with the plans and specifications prepared by the Bureau of Yards and Docks and stated in the report of last year. The design was carefully considered and is well adapted to meet the needs of the yard.

In the marine barracks the plumbing of the west wing and main building was put in fair sanitary condition during the previous year, but that in the east wing is still in an unsatisfactory state. Trapping is required, and the cesspool and closet in the rear should be filled. The cellar under the main building is reported to be damp and poorly ventilated and the cement floor and the cistern in this locality to be in bad condition.

It was intended to drain and clean the ponds on Seaveys Island during the year, but the severe drought in the summer and autumn so diminished the reserve supply of water that it was not considered expedient to have the ponds dry for the time necessary for the work. Plans have, however, been considered for a greatly increased storage of water by repairing the reservoir on Seaveys Island and constructing a standpipe with a capacity of 500,000 gallons. It seems that when this increase in the reserve supply of water has been secured, the ponds will be drained, cleaned, and refilled.

Navy-yard, Boston, Mass.—During the year the health of this yard was good, the percentage of sickness having been small and epidemic disease absent. Reports from the prison have been satisfactory and the results from the outdoor employment of inmates excellent.

The number of surgical emergency cases treated at the dispensary was large, as from 1,500 to 2,000 workmen were employed continuously during the year. These cases were, as a rule, of a minor character, but few requiring transportation to hospital.

Navy-yard, New York, N. Y.—The sanitary condition of this yard during the year has been good and the general health very satisfactory. At the marine barracks there were three cases of scarlet fever, two of measles, two of rubella, one of mumps, and two of epidemic catarrh. With the exception of the last, all were sent at once to the naval hospital and proper precautions taken to prevent the spread. The cases originated, it is stated, from exposure to similar diseases on board of vessels arriving at the yard.

The following is a list of cases among the yard workmen that received emergency treatment at the dispensary: Abrasio, 5; ambustio, 10; conjunctivitis, 1; contusio, 20; cordis valvularum morbus, 1; luxatio, 2; epistaxis, 1; fractura, 10; hernia, 1; insolatio, 1; stremma, 5; vulnus contusum, 77; vulnus incisum, 27; vulnus punctum, 1; vulnus laceratum, 67.

Plans have been made and an excellent site selected for a new and well-equipped dispensary at this yard. The building will have a lower and an upper floor, and will include offices for surgeon and assistant surgeon, a dispensary, waiting room, well-lighted operating room, and additional rooms for stores and attendants.

Navy-yard, League Island, Pa.—The complement of this yard in officers and enlisted men has been about 150. The health of the personnel has been very good, and there has been little epidemic disease except three cases of mumps. Six cases of malarial fever occurred at the barracks during the year that are considered to have originated there. New and larger barracks in a better location are now under construction, and it is believed that the health of the marines on this station will be improved by the change. The total number of malarial cases was eleven. The filling in on the west side of Main street continues, and will not be completed for some months. As the material is pumped from the back channel and spread by deposit over the island, a much more general disturbance of health was expected than has occurred.

There was only one case of typhoid fever during the year, and that appeared in a recruit nine days after enlistment.

Minor improvements have been made in the dispensary, including new sink and wash basin, new furniture, and changes in the medical and surgical outfits. The average number of workmen employed in the yard during the year was 768. Accidents were of rather frequent occurrence, but most of them were of a minor character. The following received first treatment at the yard dispensary: Abrasio, 3; ambustio ex calore, 3; contusio, 20; corpus extraneum, 3; fractura, 3; luxatio, 3; stremma, 5; vulnus contusum, 31; vulnus incisum, 10; vulnus laceratum, 10; vulnus punctum, 9; vulnus venenatum, 4. One hundred and seventy cases of disease also received emergency assistance.

The work done in the laboratory attached to the dispensary is represented by 186 chemical analyses, as follows: Water, 12; coal, 11; paints and pigments, 16; oil, 8; cements, 7; metals, 12; food stuffs, 5; urine, 16; ordnance supplies, 6; steam-engineering supplies, 4; drugs, 39; miscellaneous, 48.

Navy-yard, Washington, D. C.—The influence of the flats of the Anacostia River occupies the most important place in the consideration of the health of this yard, which for some years now has been a center of malarial infection in the naval service and in the Marine Corps. Men placed on duty at this yard are afterwards sent to other shore stations or to ships, where they from time to time have returns of the fever resulting from infection at this place. In 1895 from an average complement of 165 persons, there were 162 admitted to the sick list with malarial trouble; in 1896 the complement was 156, with 103 admissions; in 1897, 174, with 70 admissions; in 1898, 203, with 73 admissions, and in 1899, 234, with 64 admissions. In many the disease reappeared from time to time at the yard and during service elsewhere. It is, however, worthy of note that the percentages have gradually decreased from 98 in 1895 to 27 in 1899. The maximum was coincident with the period when the flats were disturbed by deepening the channel. The intensity of the poison has diminished each year during the interval of quiescence. Should an attempt be made to reclaim these flats it is more than probable that at first the number of cases in the yard and in all that section would be greatly increased. But undoubtedly the interests of the service and of the city demand the expenditure of money, however great it may be, necessary to remove such an extensive cause of sickness and distress.

The sanitary condition of the yard itself has been improved during the year. Much work has been done to fill and grade, to improve the sewerage system, and to remove all accumulations that might be prejudicial to health. Large areas have been paved and drained, and the question of the cleanliness and ventilation of the various shops has received close attention.

The work at the dispensary in this yard is necessarily more or less important, as about 2,000 men are constantly employed in the shops, and accidents are more or less frequent and at times serious. The nature of the work performed is also such as to render the question of surgical emergencies one of prominence. It is therefore apparent that the dispensary should not be lacking in facilities for giving such first-aid assistance as may be required. At present the operating room is very contracted and difficult of access, and, as there is space behind the building, a sufficient extension with a separate entrance should be built, or an entirely new dispensary provided of more modern design.

During the year there were 203 injured men given first treatment here, and in one case the left arm had been severed at the shoulder.

The cases were as follows: Foreign body in eye, 10; abrasion, 2; lacerated wounds, 26; punctured wounds, 21, incised wounds, 41; fractures, 2; contusions, 89, burns, 5; sprains, 6. Medical assistance was also given in 14 cases.

One hundred and forty-seven persons were examined for enlistment, of which number 21 were rejected—1 on account of color blindness.

In the marine barracks the system of heating is reported as inadequate, and during the winter, it is stated, there was considerable suffering from that cause. At present the men's quarters are heated by a furnace supplemented by stoves. Accumulations of coal gas were frequent during the year, and cases of sickness resulted from that cause. The cells for prisoners are not well located and are poorly ventilated.

Navy-yard, Norfolk, Va.—The health of this yard during the year 1899 has been good, though a variety of contagious diseases appeared in its vicinity. As cases of smallpox occurred in the city during the fall, measures were instituted to prevent its introduction into the yard. Every employee in the various departments, servants of families, contractors, and others were required to show certificates of vaccination. Scarlet fever and diphtheria were more or less common in the town, and therefore employees in the yard were required to report all such cases in their families and to absent themselves until their homes were free from infection. One case of typhoid fever appeared among the residents of the yard. Its source could not be traced.

The flushing of the sewers of the yard has been very inadequate, but recently connection has been made with the fire mains, and when the pumps are started an abundant head of water flushes and cleans them thoroughly. In this way many were found to be clogged, and it was demonstrated that the sewer leading from the houses in the south end of the yard had been discharging into the timber basin through an overflow sewer, the presence of which had not been indicated on the plan. The condition of the basin had been very unsatisfactory for some years, and the discovery of the cause has led to the abolition of a considerable nusiance. The extension of the sea wall, filling in low places, changing the grading of streets, paving the water front, and the making of gutters and concrete walks have been substantial improvements from a sanitary point of view. The method of disposing of garbage, mentioned in a former report, still continues, but as an appropriation of $5,000 has been recently made by Congress for the erection of a crematory this objection will soon be removed. It will be located in the southern corner of the yard. The parade ground should be raised and drained and some system adopted to prevent an accumulation of sediment in the cisterns, caused by the deposit on the roofs of the buildings from which the water is collected of material thrown off by the numerous smoke pipes in the yard. In default of some device to prevent this deposit mechanical filtration should be employed.

As the site of the old dispensary has been required for other purposes, the emergency medical and surgical work of the yard was, during part of the year, performed in temporary quarters. The plans of the new dispensary, prepared by the Bureau of Yards and Docks, show that the requirements have been carefully considered, and that, when the work has been completed, there will be every facility desired, as the building is to be well located and has been well designed. The number of emergency cases among workmen treated was 765, of which 351 were injuries. There were 21 cases requiring transportation by ambulance and 2 deaths.

Navy-yard, Pensacola, Fla.—The health of the officers and men has been satisfactory. No contagious disease appeared during the year 1899, and there were no cases of dysentery or typhoid fever. From an average complement of 85 persons only 5 cases of malarial troubles were returned. Three of these, however, were of malarial cachexia. Rain water stored in numerous cisterns is used for drinking. The large cistern containing 256,000 gallons was recemented during the year and the cisterns at officers' quarters were emptied and cleaned from time to time.

The situation of the yard on low ground renders natural drainage insufficient and the proper disposal of excreta difficult. It also facilitates the growth of molds in and about the buildings, which are generally without sufficient ventilation beneath the lower floors. Dampness is also noticeable in the prison of the yard, where the brick floor should be replaced by asphalt and concrete. Well-drained grounds and dry and well-ventilated buildings are of unusual importance in a locality as far south as this yard.

Navy-yard, Mare Island, Cal.—While the general health of this yard has been good during the year, there appear to be general insanitary conditions that should be remedied. The sewers at the marine barracks are old and too small. They are frequently blocked and should be replaced with others of larger size and different construction. The entire system of sewers in the yard is reported as unsatisfatory, and it is expected that in connection with the new buildings it will be insufficient during the season of rain.

The method of dealing with fecal matter at the marine barracks by burning is very unsatisfactory, as the air is polluted for a distance of several hundred yards. While sickness has not been traced to this condition, it is apparent that a proper sewer system should be introduced and water-closets installed. The rooms used for a dispensary and the storage of medical stores are badly arranged and much too small for the purposes indicated, and a new building is very much needed to meet the requirements of the yard in this respect.

NAVAL STATIONS.

Naval training station, Newport, R. I. (including the U. S. training ship *Constellation*).—Adequate accommodations for the large number of apprentices on this station, the necessity for which has been noted in previous sanitary reports, will be supplied within the next few months by the completion of commodious barracks on the western slope of the island. The increased facilities and improved environment resulting should have an important bearing not only upon the general health of the apprentices, but also upon the appearance and spread of those diseases more especially found among the young. During the year 1,076 apprentices were for a greater or less time under the influences of the station, as 400 remained at the end of 1898 and 676 were received during 1899. With a large number of susceptible persons in limited spaces it is not remarkable that scarlet fever, mumps, and tonsilitis appeared, with a marked tendency to spread. The outbreaks, however, subsided on the institution of sanitary measures for their control. Shortly after the appearance of scarlet fever in June, a camp was established, with the result not only of preventing the extension of the disease, but also of improving the health of the apprentices generally, the benefit of outdoor life during the months of summer and fall being apparent. While there will probably always be from time to time a history of such diseases at this station, efforts to avoid their introduction and spread will undoubtedly be attended with much success, and, as the apprentice recruit is often a source of infection, a building is now being constructed to contain a steam sterilizer of sufficient capacity to disinfect the clothing of new arrivals as well as the effects of those who have been exposed to communicable disease on the station. Epidemic influenza prevailed during the first and second quarters of the year, and there were sporadic cases during the third and fourth quarters. During the fourth quarter the use of city water for drinking purposes was discontinued, as a number of cases of typhoid fever had appeared. The epidemic was rather extensive, as 3 cases were transferred to hospital from the *Constellation*, and 28 from the apprentices quartered on the island. There were also several additional cases that were not diagnosed until after admission to hospital. For some months drinking water was furnished from a well on the station, but hereafter the supply will be chiefly obtained from a "Baird" evaporator and distiller having a daily capacity of 5,000 gallons.

Torpedo station, Newport, R. I.—The general health of this station for the year 1899 has been satisfactory, though epidemic influences prevailed in the first and second quarters. There was one case each of parotitis and pertussis occurring in children and one of typhoid fever. The accidental explosion of a detonator in the hands of a civilian employee resulted in the loss of an eye and the laceration of both hands.

Naval station, Annapolis, Md.—The commencement of the extensive work of constructing new buildings at this station renders it unnecessary to call additional attention to the sanitary defects in the old structures. Making foundations for the new armory and boat house necessitated much disturbance of the soil, and as this occurred during the warm season there was some apprehension that there would be cases of disease resulting. The health of the station, however, continued good during the year. A mild type of epidemic catarrh prevailed in the early part of the year, and during the summer cruise a number of cases of ringworm developed among the cadets on the *Monongahela* and *Annapolis* and extended after the return to the Academy. Prompt and radical measures were instituted with satisfactory results in controlling the disease and in effecting a cure. One case of measles and one of chicken pox occurred among cadets, and two cases of measles and several of whooping cough were treated in the families of officers, but the spread of the disease was prevented by prompt isolation and quarantine. The relation between the Academy and the city of Annapolis is close, and during the year cases of pertussis, morbilli, scarlatina, and diphtheria appeared in the latter from time to time. No system of placarding premises is in force in the city and the quarantine restrictions are not as rigid as the interests of the Academy demand.

Casualties from football have not been serious and have not involved much loss of time from academic work. The game has become so specialized that it is played by only a small percentage of cadets, and therefore its benefits are confined to a few. Its disadvantages were represented during the year by 101 sick days and 113 additional days lost from drills. It was responsible for 4 fractures, 1 luxation, and several sprains and contusions.

The artificial illumination, with which cadets at the Academy necessarily do much work, is now barely sufficient, and an improvement in this respect is much to be desired. On dark days the light in the temporary section rooms is also inadequate.

While the present sewerage system is efficient for existing conditions, the question of the disposal of sewage becomes important in connection with the construction of the new buildings and should be carefully considered.

The Naval Academy grounds have been very much extended in recent years and appropriations have been made for buildings to accord with its position as a national school. Old buildings have been razed and others will be razed to make room for permanent structures adapted to meet the requirements of the station. In connection with this plan of construction attention is called to the necessity for an adequate provision for the care of the sick, without which the plan will be deficient in a very important essential. It is understood that the present building used as sick quarters is among those to be razed. This building, although once enlarged, is not more than sufficient at times, and as a system has been recently adopted by which the number of cadets at the Academy will be greatly increased, the new sick quarters should not only be somewhat extensive but also designed to include the separation of contagious cases, as well as provision for such medical and surgical work as the interests of the school demand. With a large number of susceptible persons quartered in one building, the prompt segregation of those contagious diseases more especially found among the young will assume unusual importance, and as there will also from time to time be cases of other diseases of too great severity to be subjected to the noise of the main building, a detached building for the treatment of the sick would seem imperative.

Marine headquarters, Washington, D. C.—Since the last report there has been an improvement in the sleeping accommodations for the men, as the double bunk has been discarded and a larger air space provided. The buildings are, however, inadequate, and as they are only of one story the structural defects are apparent. The situation is also to some extent under the influence of conditions associated with the flats of the Anacostia River, and admissions to the sick list on account of malarial diseases are numerous. In 1895 the proportion of such cases was almost 50 per cent, about 33 per cent in 1896, 20 per cent in 1897, 8 per cent in 1898, and over 25 per cent in 1899.

A mild epidemic of influenza prevailed early in the year, and there were five cases of mumps among apprentices. One case of diphtheria occurred, but as the patient was immediately transferred and the quarters where the case developed fumigated there were no additional cases.

During the year 1899 there were examined, physically, 540 persons for enlistment, of which number 295 were rejected, 5 on account of color blindness.

Naval station, Port Royal, S. C.—The returns from this station show a satisfactory state of health for the year. The atmosphere was as a rule moist and not favorable to patients with diseases of the respiratory organs. The rainfall was not as much distributed as usual, but for the year was 45.01 inches. The minimum thermometer was 7° and the maximum 103°.

Malarial diseases were not prominent and there were no epidemics. Venereal affections were in greater number than usual. The only death during the year was caused by drowning. Cistern water continues to be used for drinking, but the supply is insufficient, and the attempt to obtain good water by boring having been without result, rain water has to be used also for general purposes. Water obtained in lighters from Port Royal is of good quality when not contaminated during transportation. On land adjoining the station an abundance of well water can be obtained at a depth of 15 or 20 feet, but it contains an excess of chlorides and, after a rain, considerable organic matter. There are several good artesian wells on neighboring islands. Their average depth is 175 to 200 feet, according to the distance from the surface of the limestone strata, beneath which good water is generally found.

Naval station, Key West, Fla.—Owing to the appearance of yellow fever in the city late in August, 1899, and to the rapid extension of the disease, the station was practically closed on September 2, the officers and enlisted men, with a very few exceptions, having been ordered North. Though this action was taken without delay, two cases occurred among those attached to the station before the orders could be carried out, and one, that of the commandant's clerk, resulted in death. Several civil employees contracted the disease later in September, and in October a quartermaster, who had been left on one of the tugs, was attacked. The epidemic at Key West was extensive, and the early removal of the force at the station was without doubt most advisable. In view of the situation at Key West during the past summer, considered in connection with the history of the preceding year, the force was again much diminished, and toward the last of July only those remained whose services were essential at a time when the operations of the stations are at a minimum.

Naval station, Puget Sound, Wash.—The health of this station has continued good during the year. Though the humidity has been excessive, rheumatic and bronchial affections have not been pronounced. Four cases of influenza were returned, two of these occurring in the detail sent to the station as the crew of the torpedo boat *Rowan* when that vessel was placed in commission.

The likelihood of a contamination of the water supply of this station, mentioned in a previous report, has increased during the year, as the town of Bremerton is extending to the northwest and its drainage tends toward the wells in the low lying ground where the pumping plant is located. These wells are only 16 feet in depth and are not far from the foot of a slope on which there are at present 34 small buildings, including dwellings and outhouses. Though the wells are largely supplied by springs in the sandbed in which they are situated, it would seem wise to acquire the neighboring land in order to remove the danger of contamination.

Naval station, Havana, Cuba.—The naval property received at this station on January 1, 1899, is situated for the most part in the unhealthy sections of the city. It consists of three divisions, the navy-yard; the part known as the Machina, including the commandant's house and the inclosure around the shears, within which there are also buildings of one story for the accommodation of a guard; and the house near the entrance to the harbor for the use of the captain of the port and as the headquarters of the pilots. These divisions are all on the water front of the harbor and are widely separated. When the property was received it was closely inspected and found to be in a very insanitary condition, much of it having also a history of infection and being under the influence of very undesirable surroundings. The navy-yard was regarded as especially objectionable from a sanitary point of view, and, as a navy-yard implies an intimate association with ships, is a depository for stores and coal, and includes dwellings for officers and barracks for the guard, its occupation for naval purposes has remained unauthorized by the Department. This yard is situated in the southwest angle of the harbor on a contracted portion of the bay where it forms a long cove. It is in the southeasterly part of the city, a section with a marked history of yellow fever. At the head of the cove is a large area of lowland intersected by streams, and one of these carries more or less refuse from the slaughterhouses of the city. The amount of this refuse has been much diminished since the United States assumed the sanitary control of the city, but at first it greatly polluted that part of the bay and appeared in large quantities on the water front of the yard. The lowland is generally regarded as being in no small degree responsible for the pernicious and fatal malarial poisoning common in a considerable portion of the city. Adjoining the eastern end of the water front of the yard is the San. José wharf, while in the corresponding position on the west is the Tallapiedra wharf, noted for the fatality that has attended its use by shipping. This was probably in great part due to the proximity of the large and very old military hospital, which is also very near the navy-yard. Some of the drains from this hospital discharged under the wharf and near the water front of the yard. This building was, however, abandoned in December, 1898, but between it and the wharves has been erected a large crematory for city refuse. The water front of the yard is for the most part without sea wall and the land for 400 feet has been made by filling with questionable material. As one of the main sewers of the city discharged at the original front and was not continued with the making of new ground, the refuse now runs for 400 feet in an open ditch. The contents of the drains from the marine barracks, sailors' quarters, temporary hospital, workmen's water-closets, and certain other places within the yard take the same course emptying into the sewer and joining the stream moving uncovered through the lower part of the yard. The yard is practically a square about 1,300 feet on a side, with high walls except, of course, on the water front. The buildings have generally only ground floors. The dwellings, although with few exceptions low, present with shade trees and flower gardens an attractive appearance. It is suggestive that the few houses with upper stories have a better reputation for healthfulness, and that each house much shaded by trees has an undesirable history. When this property was received the grounds and houses were cleaned and many cart loads of refuse removed. All accessible drains were cleared of the very deep sediment they contained, and where they were open near dwellings a covering of boiler iron, found in the yard, and of cement was supplied. All of these sewers are constructed of brick or stone and are of large size. Many are too old and some are probably still infected, though chlorinated lime was employed in considerable quantity in the attempt to render them innocuous. All of them ultimately discharge on the water front where there is very little tide.

The marine barracks has a ground area of about 8,500 square feet and contains about 200,000 cubic feet. It is situated in the upper part of the yard near the wall opposite the water front. The building formerly used as sailors' quarters and temporary hospital is somewhat smaller. Both buildings have only ground floors made of large stones set in cement. The windows are small and infrequent and the buildings are dark. As dwelling places they would be unsatisfactory, though the roofs extend beyond the walls, leaving spaces for ventilation, and the stone paving shows little sign of dampness.

A large number of cesspools were found about the yard, some of them in unexpected places. Closets emptied into these or into the sewers. Much faulty plumbing was discovered, and at the barracks this was prominent. Many of the cesspools were unnecessary and badly placed. These were cleaned, broken, and filled, and in some cases pipe was laid and other connections made. As a rule, however, the sanitary work done within the yard was not so much with a view to occupation as to place the property in a sufficiently good condition for such occasional utilization as the local needs of the station might require, and for such temporary occupation as some emergency might demand. With this end in view, the barracks and some of the other dwellings were ultimately fumigated and washed with solution of corrosive sublimate. Immunes were employed as watchmen until recently, when the property was utilized by the Government for local purposes.

The second division of the naval property, known as the Machina, and consisting of the commandant's house and buildings for the accomdation of a guard, is near the custom wharves of the city, and its water front is used as a landing by ships of war and other Government vessels. Considerable sanitary work was done in this locality as the requirements of the station necessitated its occupation. Cesspools were cleaned, broken, and filled, drains remade, additional pipes laid, water-closets installed, buildings thoroughly cleaned, floor of guard-house and detached building removed and cement floors laid, damp plaster removed and replaced with cement, and all buildings disinfected and whitewashed or painted. It was noted that in some parts of the property rooms on ground floors had been connected with cesspools and sewers by rats, which had formed tunnels of considerable size. This necessitated the remaking of much ground. The commandant's house, which also contains the offices of the station, was soon occupied, but the work on the buildings in the Machina inclosure was not completed until late in April, the marines coming ashore from the station ship *Resolute* on the 27th of that month to live in these quarters. The guard, consisting of about forty men, enjoyed fairly good health until June 12, when a case of yellow fever appeared. There was no other case among them until August 13, shortly after which time the marines were removed and immune watchmen employed to guard the property. This result was expected, for, though neither of these cases seems to have originated on the property, the men had access to the city, and, it is stated, not infrequently at times when they were presumed to be in the barracks. Both cases were immediately removed to the detached building within the inclosure which had been selected and arranged for hospital purposes, and the precautions were such as to prevent a general infection. In addition to the marines there were persons in the naval service attached to the station, including the complement of the station tug. In all, there were eight cases of yellow fever during the year, with four deaths. The last case appeared on November 21. In the meantime many of the enlisted force had been removed north, and at the end of the year only thirty remained. A further reduction was made in August last, as other cases were occurring, and experience had shown that in the sickly season only those persons should be kept on the station who are necessary to maintain its integrity as such.

Naval station, San Juan, Porto Rico.—Extensive sanitary work was commenced immediately after the station was received in 1898. This work was continued and completed during 1899, so that now the condition of the buildings and grounds may be regarded as good, though the position on the water front tends to more or less dampness. This tendency was recognized when the houses used for the men's quarters were largely reconstructed, as the floors were placed some distance from the ground, which was also ceiled with cement. Drains have been completed, water-closets installed, and a low sea wall constructed on the northeastern side of the station. This last prevents the deposit of organic matter on the water front and should be extended to complete the protection. A distilling plant has been installed and the water introduced into the city in 1899 led into the station. The sick quarters were occupied in February, 1899, after thorough repairs. The building is a one-story structure with good accommodations for eighteen patients, and, besides the ward, includes thoroughly equipped operating room, dispensary, bathroom, storerooms, offices and quarters for attendants. In emergencies the sick of the vessels of the Navy visiting San Juan have also been cared for here until in a suitable condition to be transferred north. The general health of this station has been good, though its situation from a sanitary point of view can not be regarded as very desirable. Nine cases of dengue were returned during the year. All of these cases appeared during the last quarter and were of a mild type. The disease had prevailed in the city during the entire year. There were seven cases of intermittent fever, and one each of morbilli, rheumatism, and tuberculosis.

As a result of thorough vaccination on the island smallpox has become infrequent. A permanent vaccine farm has been established by the board of health and the various districts are supplied regularly with virus. Not a case of yellow fever was reported on the island during the year 1899.

Naval station, Guam, L. I.—The U. S. S. *Yosemite* arrived on August 7, 1899, and established this station. Work was then commenced on the government house, barracks, and other public buildings at Agana, the capital, and they were with much labor put in order for our forces. An evaporating plant was also installed and sewers provided. A small hospital was established, but the building proving inadequate a larger building has recently been fitted up for that purpose. The capital, as is the case with most of the villages, is built on the lowland at the coast, the elevation being from 4 to 12 feet. There are neither sewers nor other provision made for drainage, but the soil is sufficiently porous to carry off rapidly the collections of water following the heavy rains. Typhoid fever is practically epidemic among the natives, owing to the pollution of drinking water in shallow wells near cesspools and to the very common lack of any provision whatever for the receipt of refuse matter. The disease soon appeared among the enlisted force as access to contaminated water was, under the circumstances, unavoidable. During less than five months there were 25 cases and 4 deaths from this cause in a force of 143 men. The climate is debilitating. The mean annual temperature is about 77°, but in the winter months, though the days are hot from the larger amount of sunshine, the nights are sufficiently cool for blankets. It is also at this season that the humidity is lessened and the trade winds are most constant. From June to November or December the rainfall is heavy and almost constant, but during the rest of the year the climate is very agreeable for the Tropics.

Leprosy is not common and the disease is not increasing. There are only 14 cases known to be on the island at this time. Considering all the circumstances, the conditions are not favorable at this station for continuous good health. Excluding the influences incident to life in the Tropics, the present station is in too close proximity to surroundings made unfavorable by the long occupation of a people unaware of sanitary requirements. It is worthy of note that the health record of the *Yosemite*, anchored near Cabras Island, has been excellent, and it is probable that a naval station established there would enjoy far better health than the one at Agana. As Cabras Island is not inhabited its soil is free from infection. Its natural drainage is excellent, and it is reported that there is at hand an ample supply of potable water.

At Agana the total number of admissions to the sick list from an average complement of 143 during the 122 days in 1899 the station was in operation was 155, distributed as follows: Febris enterica, 25; febris intermittens, 4; septicæmia, 1; cephalalgia, 1; febris ephemera, 3; melancholia, 1; neuralgia, 3; prostratio thermica, 3; otalgia, 1; rhinitis acuta, 2; catarrhus gastricus acutus, 14; catarrhus intestinalis acutus, 9; dentis caries, 1; diarrhœa simplex, 26; hæmorrhois, 2; hepatis congestio, 1; odontalgia, 1; tonsillitis, 3; angina pectoris, 1; cordis palpitatio, 6; bronchitis acuta, 14; myalgia acuta, 1; synovitis, 1; abscessus, 3; cellulitis, 1; furunculus, 3; impetigo, 6; lichen, 1; verruca, 1; orchitis, 1; prostatitis, 1; abrasio, 2; contusio, 4; stremma, 3; vulnus incisum, 2; vulnus laceratum, 1, and alcoholismus, 2. There were 5 deaths, 4 from typhoid fever and 1 from septicæmia. One hundred and twenty-four cases were discharged to duty, 4 were transferred from the station, and 22 were continued to the next year. The total number of sick days was 1,918.

Naval station, Cavite, P. I.—Considerable work has been done to improve the sanitary condition of this station, and the work is continued under a realization of the importance of securing the best environment practicable for a force living in the Tropics and within grounds occupied for so many years. The rough cleaning continues and the lower places in the yard are being filled with broken brick and old plaster. The marines, numbering 413 at the close of the year, are quartered in three separate barracks, viz: Lower barracks, back of the old palace building, 72 men; main barracks, near the gate, 229 men, and San Felipe barracks, within the fort, 112 men. The roofs of the main and San Felipe buildings are corrugated iron without ceiling. The absence of a ceiling and air space under the roof renders these buildings warmer and less comfortable than they should be. At the San Felipe and lower barracks the damp tile floors have been removed and cement floors substituted, air space beneath being secured by brick arches. The mess hall is in the main barracks, and is large, well ventilated, and conveniently arranged. The range is under shelter outside the building, and all water-closets exhaust over the sea wall.

Additional quarters with the living rooms overlooking the bay have been built in San Felipe fort for the marine officers attached to the station, and a new cemented stone conduit has been constructed from the San Felipe inclosure to the bay.

The twelve naval officers of the station have been quartered in the old palace building and a detached dwelling. These quarters are well ventilated and fairly comfortable. The force at this station is necessarily large and the number of civil employees, 1,500 at the end of the year, added to the medical work. There are also 130 women and children, families of Filipino laborers, quartered in the old Guadalupe fort on the southeast water front of the yard, whose methods of living require constant supervision. Small gunboats unprovided with medical officers also create a demand upon the medical department of the yard. In spite of the sanitary work and the efforts to secure a good environment the health of the station is not satisfactory, as during the nine months of the year the dispensary was established there were 3,703 sick days, 300 cases of fever, 16 of dysentery, and 83 of diarrhea. Of course the number of sick days was much less than the cases actually furnished, for 92 of the sick were transferred to the naval hospital near at hand.

For the work required the dispensary and sick bay are inadequate. The latter, which is in the lower barracks, is 39 feet long and 13 feet wide. Owing to circumstances, transfers to hospital have been restricted to cases requiring more than a few days' treatment, and mild cases of fever and diarrhea among marines and the crews of small vessels are cared for in the sick bay of the yard. The cases of fever are chiefly calentura, dengue, and typhoid. The last originated at

Cavite or Manila, as there seem to be no conditions at the yard from which the disease could develop. The officers use only distilled water and the enlisted men Manila city water that has been boiled.

Owing to the large proportion of the naval force on the Asiatic station, and especially about the Philippine Islands, where supplies are either not obtainable or in the emergencies governing the movements of ships not readily purchased, it was considered advisable during the year to establish a storehouse for medical and surgical supplies at the Cavite station. Two rooms, one 22 by 24 feet and the other 20 by 22 feet, have been utilized for this purpose, the requisite shelves and lockers having been fitted. While the accommodations have not been extensive, the importance of this central supply has been very apparent, especially in furnishing our vessels with compressed tablets, tablet triturates, hypodermic tablets, hospital stores, and the necessary quantity of surgical dressings which can not be obtained at Manila even in emergencies. Complete medical and surgical stores for the Asiatic fleet have been forwarded to Cavite from the naval laboratory, the regular distributing depot, and though the quantities shipped at one time have been amply sufficient to last for months, there has been very little loss in transportation.

RECEIVING SHIPS.

U. S. receiving ship Wabash.—The general health of this vessel during the year has been very good, and there has been no case of epidemic disease. Only minor changes have been made in construction, but among them may be noted the installation of water-closets in the after part of the wardroom and the substitution of similar modern appliances for those in the sick bay water-closet.

The work of recruiting has been much less than during the previous year. The number examined for enlistment was 1,205, of which 580 were accepted, 62 rejected for color-blindness, and 563 rejected for other causes.

As a result of work on the new dry dock, the position of this vessel has been somewhat changed for the better from a sanitary point of view.

U. S. receiving ship Vermont.—The average number of persons on board this vessel during the year was 592. There were no epidemic diseases except in the first quarter, during which 9 cases of measles, 3 of erysipelas (facial), and 24 of epidemic catarrh were admitted. The transfer to hospital of contagious cases prevented extension.

As a large number of persons are examined for enlistment each year and very many recruits begin their naval life on this vessel, the introduction of epidemic diseases is remarkably infrequent. The general health of the ship has also been good during the year, in spite of the age of the vessel and the long uninterrupted occupation by a large force.

The conditions under which the examinations of recruits are conducted are not as favorable as they would be on shore, as the space for the performance of this duty is too contracted, the light is insufficient, and the noise of the ship objectionable. Bathing facilities are also lacking. This work during 1899 was not as extensive as in the previous year, when 5,765 persons were examined physically. During the past year the number was 3,544, 2,324 being accepted and 1,220 rejected, 18 of the latter on account of color-blindness.

A large percentage of the applicants were natives of New York City and were candidates for enlistment as apprentices and landsmen. An extensive decay of teeth was noticeable in many of them, as an indication of a general lack of sound organization.

An improvement in the ventilation of this vessel has been effected by placing 18 sheet-iron flues on the roof of the spar deck. As the openings are fixed the benefit derived is without interruption. New water-closet fixtures have been placed in the closets for officers and also in those of the prison on the cob dock. The prison is generally overcrowded, and the building is not only inadequate, but, from a sanitary point of view, also unsuitable for the purpose for which it is employed.

U. S. receiving ship Richmond.—The most important change made in this vessel during the year has been the introduction of electric lights. This has removed a source of discomfort and greatly lessened the vitiation of the air between decks.

The health of the ship's company has been good. There were two deaths, one due to heart trouble and the other to apoplexy.

During the year there were 1,075 candidates examined for enlistment, of which number 514 were accepted and 561 rejected. Of the latter number 13 were rejected for color-blindness.

U. S. receiving ship Franklin.—During the year this vessel has been connected with the shore by means of a landing bridge, and thus the men have opportunity for exercise in the open air. Greatly increased facilities have also been afforded the ship's company for bathing and also for washing and drying clothing. On the Government property of St. Helena additional buildings, intended to be utilized in connection with the ship, were under construction at the end of the year, and a laundry will soon be completed at a cost $5,000.

The total number of persons examined for enlistment during the year was 466, of which number 317 were accepted and 149 rejected, 13 on account of color-blindness.

U. S. receiving ship Independence.—The most important change made in this vessel during the year was the destruction of the ship's head, which has been replaced by a large modern water-closet. The advantages of this change were particularly marked during the third quarter of the year, when the enlisted men on board numbered 930. It was during this period that the ship was much overcrowded and the advisability of providing additional accommodations by building on shore emphasized. Such a building could under ordinary circumstances be very profitably utilized as a gymnasium and drill room. The necessity for such an arrangement in the absence of suitable grounds near the ship for drills and open-air sports has been indicated in a previous report.

Owing to changes made in 1898 the bilges are now easily kept clean, and it is to that condition and the cleanliness of all other parts of the ship that the continued improvement in health during the past year is largely traceable.

The environment of the commissioned and warrant officers has also been improved by changing the bulkhead in both the upper and lower wardrooms, thus increasing the light and facilitating ventilation. A general advantage has resulted from the introduction of steam heat to all parts of the ship, thereby increasing the comfort during the winter months and making the temperature more uniform.

Owing to the limited accommodations of the station during the building of the new hospital, now in commission, transfers of the sick from this vessel were somewhat limited during the year 1899, more patients than would otherwise have been the case having been retained on board for treatment. Additional cots with woven-wire mattresses were placed in the sick bay, and other improvements made in the medical department.

Two cases of mumps appeared during the year, but with isolation the disease did not spread. The deaths numbered two, one resulting from dilatation and rupture of the left auricle of the heart, and the other from cirrhosis of the liver. The total number of persons examined during the year for enlistment was 1,101; of this number 315 were rejected. Sixty-nine were examined for enlistment as apprentices, and 37 of them accepted. The establishment of a naval training station on Yerba Buena Island, and the enlistment of apprentices there since March, 1899, have eliminated physical examinations on the *Independence* for that rating.

Considering the question of receiving ships as a whole, it has been very evident for some years that these vessels do not meet the requirements. As a result buildings have been erected near some of them in order to supply many deficiencies long recognized in the vessels themselves. Wherever this has been done only good has resulted, the increased cleanliness of person and clothing, and the removal from the ship of many sources of contamination tending always to improve the morale and health of the personnel. The present system perpetuates the commissions of old wooden ships, and it has been recognized that the longer such vessels are kept in commission the greater the tendency to disease among those living on board. This is doubtless due to the unavoidable influence of the emanations from men living greatly crowded in a structure composed of wood, and undergoing in many of its recesses the vital changes of decay. The amount of crowding is generally great and at times very excessive, and the ventilation is deficient and necessarily associated with drafts, in which many of the men are required to sleep. The conditions are in proportion to the crowding unfavorable to the health of the enlisted men under instruction or awaiting transfer. Replacing these ships by barracks, as is contemplated by the Department, would add greatly to the health and comfort at these centers where the enlisted force begins a naval life.

MEDICAL CONGRESSES, ASSOCIATIONS, AND CONVENTIONS.

American Public Health Association.—This association met at St. Paul, Minn., October 31 to November 3, 1899, and the Medical Department of the Navy was represented by Medical Director T. J. Turner, U. S. N.

Convention for the Decennial Revision of the United States Pharmacopœia.—Medical Director C. H. White, U. S. N., was designated by the Bureau and ordered by the Department as the delegate to represent the Medical Department of the Navy at the meeting of this convention in Washington, D. C., on May 2, 1900.

Association of Military Surgeons of the United States.—Medical Directors George W. Woods, U. S. N., and John C. Wise, U. S. N., represented the Medical Department of the Navy at the meeting of this association in New York City, May 31 to June 2, 1900. A report of the proceedings of the association prepared by the latter, and also an interesting paper entitled "A method of transporting the wounded on ships of war," read by him at the meeting, will be found among the special reports.

American Medical Association.—This association met at Atlantic City, N. J., the 5th to the 8th of June, 1900, and Medical Director R. A. Marmion, U. S. N., was ordered as the delegate to represent the Medical Department of the Navy. His paper on the proceedings of the association will be found among the special reports.

International Congress of Medicine—International Congress of Hygiene and Demography.—In compliance with an invitation received by the Department from the French Government, Medical Inspector D. N. Bertolette, U. S. N., was ordered as a delegate to represent the Medical Department of the Navy at the foregoing congresses, which were held on August 2 to 9 and on August 10 to 17, 1900, respectively, at Paris, France.

NAVY PENSIONS.

The following is a statement of the work performed by the pension division of the Bureau during the fiscal year ending June 30, 1900:

Pension cases remaining on hand June 30, 1899	0
Received during fiscal year ending June 30, 1900	1,879
Answered during fiscal year ending June 30, 1900	1,879
Remaining on hand June 30, 1900	0
Cases for board of medical examiners received and answered	243
Cases for retiring board received and answered	38
Certificates of death received	184
Reports of medical survey received and acted upon	1,128
Cases from Civil Service Commission received and answered	47
Cases of physical rejection, transfer of patients, and miscellaneous letters received and answered	1,383

There has been a continued reduction in the number of medical histories furnished the Pension Office. During the fiscal year ending June 30, 1898, the calls from the Pension Office numbered 3,908, and in the following year 2,422, while in the present report the total is only 1,879. This reduction is more notable when it is considered in relation to the recent period of war with Spain, and is in accord with the statistical returns showing the remarkable freedom from disease of the personnel of the Navy during that war.

It was expected that, as the years increased since the close of the civil war, the claims for pensions would diminish, but the considerable reduction shown is regarded as additional evidence of the good health of the Navy during the intervening period of hostilities.

The increase in the number of cases of physical rejection referred to the Bureau and the continued large number of reports of medical survey received are incident in great part to the expansion of the naval service, augmenting the number of physical examinations for admission and the number of recruits who are liable to exhibit weaknesses not discovered or not discoverable prior to enlistment.

UNITED STATES NAVAL MUSEUM OF HYGIENE.

During the year thirty-four additions have been made to the exhibit. illustrating food, exercise, bathing, lighting, surgical appliances, deformities, building material, filtering, textile fibers, drainpipes, paving material, and transportation of wounded. A rearrangement of the entire exhibit has been made and the articles more definitely classified.

Five hundred and thirty-seven chemical, bacteriological, and microscopical examinations have been made. Most of these were for the purpose of clinical diagnosis, and the substances embraced were blood. sputum, urine, tumors, and calculi. Examinations of preserved eggs and also of preserved beef were made to determine their availability for ships' rations. Analyses of two commercial milk preservatives disclosed the presence of about 4 per cent of formaldehyde in each.

The library was increased during the year by the addition of 193 volumes of bound books, and complete files of medical and scientific journals, including health reports, for that period, have been received and placed for convenient reference and public use.

The museum has also been engaged in the selection and arrangement of a new microscopical outfit for issue, and has succeeded in obtaining in convenient form a limited number of such additional outfits for distribution and practical trial on naval vessels. The object has been to reduce the bulk of those now in use and at the same time to supply an improved and convenient instrument with such accessories only as would be of practical value under the conditions incident to service at sea.

In conclusion, attention is called to the good health of the Navy and Marine Corps during the year 1899. It is apparent from the accompanying statistical report that not only was the total number of cases under treatment, per 1,000 of strength, smaller than for several years, but also the death rate from disease less than the average for the same period. Owing to twenty-one deaths from gunshot wounds, the mortality rate from injuries was somewhat increased.

Very respectfully,

W. K. Van Reypen,
Surgeon-General United States Navy.

The Secretary of the Navy.

Estimates of appropriations required for the service of the fiscal year ending June 30, 1902, by the Bureau of Medicine and Surgery, Navy Department.

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1901.
SALARIES.			
Chief clerk (act of Apr. 17, 1900)	$2,000.00		
One clerk of class 3 (same act)	1,600.00		
One clerk of class 2 (same act)	1,400.00		
One clerk of class 1 (same act)	1,200.00		
One clerk of class E (same act)	1,000.00		
Two copyists, at $840 each (same act)	1,680.00		
One laborer (same act)	660.00		
One janitor for naval dispensary (same act)	600.00		
One laborer for naval dispensary (same act)	480.00		
		$10,620.00	$10,620.00
MEDICAL DEPARTMENT.			
For surgeons' necessaries for vessels in commission, navy-yards, naval stations, Marine Corps, and Coast Survey, and for the civil establishment at the several naval hospitals, navy-yards, naval laboratory and department of instruction, museum of hygiene, and Naval Academy, $95,000 (appropriated, act of June 7, 1900)	95,000.00	95,000.00	95,000.00

Estimates of appropriations required for the service of the fiscal year, etc.—Continued.

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1901.
NAVAL HOSPITAL FUND.			
For maintenance of the naval hospitals at the various navy-yards and stations, and for care and maintenance of patients in other hospitals at home and abroad, $40,000 (appropriated, act of June 7, 1900)	$40,000.00	$40,000.00	$40,000.00
CONTINGENT, BUREAU OF MEDICINE AND SURGERY.			
For freight, expressage on medical stores, tolls, ferriages, transportation of sick to hospitals, transportation of insane patients; care, transportation, and burial of the dead; advertising; telegraphing; rent of telephones; purchase of books and stationery; binding of medical records, unbound books, and pamphlets; postage and purchase of stamps for foreign service; expenses attending the medical board of examiners; rent of rooms for naval dispensary; hygienic and sanitary investigation and illustration; sanitary and hygienic instruction; purchase and repairs of wagons and harness; purchase of and feed for horses and cows; trees, plants, garden tools, and seeds; furniture and incidental articles for the museum of hygiene, naval dispensary, Washington, naval laboratory, sick quarters at Naval Academy and marine barracks, surgeons' offices and dispensaries at navy-yards and naval stations; washing for medical department at museum of hygiene, naval dispensary, Washington, naval laboratory and department of instruction, sick quarters at Naval Academy and marine barracks, dispensaries at navy-yards and naval stations and ships and rendezvous, and for minor repairs on buildings and grounds of the United States Naval Museum of Hygiene, and all other necessary contingent expenses, $30,000 (appropriated, act of June 7, 1900)	30,000.00	30,000.00	30,000.00
REPAIRS, BUREAU OF MEDICINE AND SURGERY.			
For necessary repairs of naval laboratory and department of instruction, naval hospitals and appendages, including roads, wharves, outhouses, sidewalks, fences, gardens, farms, and cemeteries, $20,000 (appropriated, act of June 7, 1900)	20,000.00	20,000.00	20,000.00
NAVAL HOSPITAL, NEWPORT, R. I.			
Filling pond, grading grounds, and additional appropriation for addition to naval hospital at Naval Training Station, Newport, R. I., $20,000, to be immediately available (appropriated, act of June 7, 1900)	20,000.00	20,000.00	20,000.00
Explanatory note.—Twenty thousand dollars was appropriated by act approved June 7, 1900, for "addition to the naval hospital at Naval Training Station, Newport, R. I." Plans were drawn and specifications made for the addition, which was found to be more comprehensive than originally intended, and necessitated grading grounds and filling in a pond, as well as supplying a complete heating and laundry plant for the old as well as the new building. The lowest bid for the work was over $30,000, which did not include any grading or filling the pond. The additional appropriation is asked for to properly complete the work. It is also requested that it be made immediately available so as to have the hospital ready as soon as possible after the completion of the new quarters for apprentices.			

STATISTICAL REPORT

OF THE

HEALTH OF THE NAVY AND MARINE CORPS FOR THE YEAR 1899.

The health record of the Navy and Marine Corps for the calendar year 1899 shows a marked decrease in the ratio of admissions to the sick list per 1,000 of strength when compared with the previous year, and indicates a satisfactory condition of health, notwithstanding the continued presence and prolonged cruising of ships in tropical waters and the occupation of shore stations in tropical possessions. This ratio during the past year was 783.03 as against 871.69 in 1898, 838.53 in 1895, 775.75 in 1896, and 748.24 in 1897.

The average strength of the active list for the year 1899 was 20,819. Complete returns were received by the Medical Department from a total force of 20,113, the difference representing persons on detached and special duty, leave, or waiting orders, and crews of small vessels unprovided with medical officers, from whom returns in detail are not received. The average strength, as shown by reports of the Medical Department, is employed in computing all ratios except those of deaths and discharges from the service for disability.

The total number of admissions for disease was 12,794, and for injuries 2,955, giving a ratio per 1,000 of strength of 636.11 and 146.92, respectively. The ratios for 1898 were 695.42 and 176.27. The daily average of patients was 645.82, and the ratio per 1,000 of strength 32.11, as against a ratio of 29.46 in 1898. The total number of sick days was 235,725, giving an average of 11.22 days for each man of the Navy and Marine Corps, and 14.97 days as the average duration of treatment per case. In 1898 the corresponding averages were 10.75 and 12.33, respectively.

The relative increase in the number of sick days with a smaller number of persons under treatment may be considered in connection with the change in the conditions of service during 1899, when a large proportion of the personnel was employed on the Asiatic station, principally about the Philippines. Under the circumstances, cases of permanent disability from disease or injury remained under treatment while awaiting transportation to the United States and discharge from the service.

The number of persons invalided from the service (including retirements of officers for disability and transfers to the Government Hospital for the Insane) was 542, a ratio per 1,000 of strength of 26.03. In 1898 there were 884 persons invalided from the service, and the ratio per 1,000 of force was 36.85.

There were 153 deaths during the year, of which 95 were from disease and 58 from injuries (including poison). The death rate was 7.35 per 1,000 of strength (4.56 from disease and 2.79 from injury). The death rate per 1,000 of strength in 1898 (exclusive of the *Maine* casualties) was 7.21 (4.92 for disease and 2.29 for injury).

During the year there were admitted to the sick list of the total force 943 cases of malarial diseases, 900 of diarrheal affections, 884 of wounds, 716 of rheumatic affections, 685 of bronchial affections, 672 of epidemic catarrh, 297 of dengue, 193 of alcoholism, 154 of heat stroke, 134 of typhoid fever, 117 of pneumonia, 87 of pneumonic tuberculosis, 68 of dysentery, 42 of organic heart disease, 37 of measles, 31 of nephritis, 29 of scarlet fever, 8 of yellow fever, and 6 of smallpox.

Of the 943 cases of malarial diseases nearly one-third were from the navy-yard and marine headquarters, Washington, D. C. Of the 134 cases of typhoid fever reported during the year, 49 were under treatment in the naval hospital, Newport, R. I. Of this number, 45 originated among the personnel of the training station, 1 was received from the torpedo station, and 3 from the ships of the North Atlantic Squadron.

Twenty-five cases of typhoid fever were returned from the naval station, Guam, L. I., and 2 from the Cavite station.

The prevalence of typhoid fever in the force afloat and the remaining shore stations and hospitals was as follows: North Atlantic Squadron, 18 cases; Pacific Squadron, 7; Asiatic Squadron, 9; receiving ship *Richmond*, 2; navy-yard, New York, 1; navy-yard, League Island, 1; navy-yard, Washington, 2; navy-yard, Norfolk, 1; naval dispensary, Washington, 2; naval hospital, Chelsea, 2; naval hospital, New York, 1; naval hospital, Philadelphia, 1; naval hospital, Washington, 4; naval hospital, Norfolk, 4, and naval hospital, Cavite, 6.

The cases of yellow fever in the regular returns were from the naval station, Havana, Cuba; but, 1 death from that disease occurred elsewhere.

The six cases of smallpox occurred on the Asiatic Station, as follows: Naval station, Cavite, 2; *Monadnock*, *Monocacy*, *Olympia*, and *Oregon*, 1 each.

There were 21 deaths during the year from gunshot wounds. Among the deaths from disease incident to naval operations in the Tropics were 5 from yellow fever, 4 from smallpox, and 3 from diarrheal affections, including 1 case of chronic dysentery.

There were 11 deaths from typhoid fever, occurring as follows: Naval station, Guam, 4; naval training station, Newport, 2; naval dispensary, Washington, D. C., 2, and 1 each on the *Bennington* and at the navy-yard, Washington, and naval hospital, Chelsea.

The prevalence of special diseases, with relation by scale, is shown in Table XIV.

RECRUITING.

The following table shows the record of enlistments and rejections for the year 1899:

Where examined.	Number examined.	Number accepted.	Number rejected.	Color-blind.
Receiving ships:				
Wabash, Boston, Mass	1,205	576	629	63
Vermont, Brooklyn, N. Y	3,544	2,324	1,220	18
Richmond, League Island, Pa	1,075	514	561	13
Franklin, Norfolk, Va	503	335	168	12
Independence, Mare Island, Cal	1,101	786	315	21
Total	7,428	4,535	2,893	127
Marine rendezvous:				
Boston, Mass	580	491	89	10
New York, N. Y	831	430	401	75
Philadelphia, Pa	839	526	313	7
Washington, D. C	577	279	298	5
San Francisco, Cal	395	185	210	10
Total	3,222	1,911	1,311	107
Ships and shore stations other than receiving ships and marine rendezvous	6,774	4,729	2,045	83
Grand total	17,424	11,175	6,249	317

Number rejected per 1,000 for all causes	341.43
Number rejected per 1,000 for color-blindness	18.19

INSANE OF THE NAVY.

Number of patients from the Navy and Marine Corps in the Government Hospital for the Insane on June 30, 1899	99
Admitted during the fiscal year ending June 30, 1900 (1 officer and 43 seamen and marines)	44
Total	143
Discharged during the fiscal year ending June 30, 1900 (died, 5; recovered, 14; improved, 3; escaped, 1)	23
Remaining in that institution June 30, 1900 (12 officers and 108 seamen and marines)	120

NAVAL HOSPITALS.

SUMMARY FOR THE YEAR 1899.

Cases met with in the hospitals appear, as a rule, in the returns from the stations where the disease or injury was contracted. All such cases are indicated in Table XIII, p. 101, in the column "Readmitted," while diseases or injuries first recorded in hospitals appear in the same table in the column "Admitted," and are regarded as original admissions.

Naval Hospitals, 1899.

Hospitals.	Number of cases under treatment.				Number invalided from service.				Number dead.				Number discharged to duty.				Average number daily under treatment.	Average number of days' treatment per case.
	Remaining from last year.	Admitted during the year.		Total.	Diseases.	Injuries.	Total.	Ratio per 1,000 of cases treated.	Diseases.	Injuries.	Total.	Ratio per 1,000 of cases treated.	Diseases.	Injuries.	Total.	Ratio per 1,000 of cases treated.		
		Diseases.	Injuries.															
Portsmouth, N. H	12	60	11	83	10	2	12	144.58	1	......	1	12.05	46	9	55	662.65	6.75	29.66
Chelsea, Mass	90	258	20	368	30	3	33	89.67	5	......	5	13.59	208	18	226	614.13	49.63	49.21
Newport, R. I	15	446	36	497	14	2	16	32.20	11	......	11	22.13	416	35	451	907.45	30.19	22.18
Brooklyn, N. Y	102	553	73	728	140	16	156	214.29	14	2	16	21.98	359	56	415	570.05	71.77	35.98
Philadelphia, Pa	49	160	27	236	23	6	29	122.88	2	......	2	8.47	161	26	187	792.37	20.72	32.04
Washington, D. C	22	265	28	315	13	3	16	50.79	2	......	2	6.35	254	24	278	882.54	18.24	21.14
Norfolk, Va	64	279	23	366	57	15	72	197.00	4	......	4	10.93	200	17	217	592.90	44.86	44.74
Port Royal, S. C	......	13	3	16	......	1	1	62.50	1	......	1	62.50	11	2	13	812.50	1.39	31.81
Pensacola, Fla	1	16	1	18	2	......	2	111.11	......	......	......	......	15	1	16	888.89	2.75	55.83
Mare Island, Cal	28	257	49	334	96	31	127	386.24	4	2	6	17.96	124	23	147	446.12	41.52	45.37
Sitka, Alaska	1	15	4	20	......	......	......	......	1	1	2	100.00	11	3	14	700.00	.82	150.50
Yokohama, Japan	8	53	6	67	......	......	......	......	......	......	......	......	24	1	25	373.13	9.43	51.37
Cavite, P. I.[1]	......	282	48	330	7	3	10	30.30	4	3	7	21.21	189	22	211	639.39	30.07	25.34

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[1] This hospital received its first patients on March 27, 1899.

NAVAL HOSPITALS.

The total number of cases under treatment in the various naval hospitals was 3,377, a decrease of 294 when compared with the year 1898. The average number of patients daily under treatment was 328.15, a ratio of 16.32 per 1,000 of force. During the previous year the daily average was 339.75 and the ratio per 1,000 of force 14.74. The average number of days' treatment per case was 34.69 for 1899 and 33.78 for 1898. The deaths numbered 57 and the invalided from service 474, the ratio per 1,000 of cases treated being 16.88 for the former and 140.36 for the latter. The corresponding ratios for the previous year were 19.61 and 200.21, respectively. Among the invalided from service are included 26 patients transferred to the Government Hospital for the Insane. In 1898 there were 18 such patients transferred to that institution.

The diseases most prevalent and the causes of death and invaliding are shown in the following detailed statement of the various hospitals.

NAVAL HOSPITAL, PORTSMOUTH, N. H.

(*Statistics.*)

Medical Inspector Ezra Z. Derr, U. S. N., *In charge.*

During 1899 there were 83 cases under treatment, including 12 remaining from the previous year, a decrease of 49 when compared with the year 1898. The average number daily under treatment was 6.75; for previous year, 10.54. The average number of days' treatment per case was 29.66; for previous year, 29.14. Of the 71 admissions during the year 6 were due to articular rheumatism, 3 each to chronic bronchitis and epidemic catarrh, 2 each to remittent fever, pneumonic tuberculosis, epilepsy, neuralgia, and tonsilitis, and 1 each to bronchial catarrh, tinea, erysipelas, intermittent fever, pneumonia, rubella, osteomyelitis, chronic laryngitis, myalgia, hemiplegia, spinal irritation, mania, melancholia, amblyopia, aneurism, organic heart disease, varix, phimosis, diarrhœa, and ingrowing nail.

Invaliding.—There were 12 discharges from the service for disability, the causes being: Epilepsy, 2 cases; and pneumonic tuberculosis, hemiplegia, mania, neuralgia, chronic bronchitis, necrosis, osteomyelitis, cystitis, hernia, and alcoholism, 1 each. The case of necrosis remained from the previous year, and that of mania was transferred to the Government Hospital for the Insane. The ratio per 1,000 of all cases under treatment was 144.58; for previous year, 128.79.

Mortality.—There was one death, and that was due to aneurism.

Venereal diseases.—Four cases each of orchitis and chancroid, 3 each of gonorrhea and adenitis, 2 of gonorrheal arthritis, and 1 each of primary syphilis, cystitis, epididymitis, and gonorrheal ophthalmia were admitted during the year. The case of cystitis was invalided.

Injuries and poisons.—Under this class 11 cases were admitted; 2 for alcoholism and 9 for injuries (3 for sprains, 2 each for fractures and contusions, and 1 each for hernia and luxation). One case each of hernia and alcoholism were invalided.

NAVAL HOSPITAL, CHELSEA, MASS.

(*Statistics.*)

Medical Director JOSEPH G. AYERS, U. S. N., *In charge.*

There were 368 cases under treatment during the year, including 90 remaining from 1898, a decrease of 161 when compared with the previous year. The average number of cases daily under treatment was 49.63; for previous year, 57.30. The average number of days' treatment per case was 49.21; for previous year, 39.53. Of the 278 admissions, 17 were for articular rheumatism, 11 for pneumonia, 7 for epidemic catarrh, 6 for bronchitis, 5 each for hemorrhoids and pneumonic tuberculosis, 4 each for neuralgia and anal fistula, and 3 each for typhoid fever, mumps, melancholia, neurasthenia, otitis, tonsilitis, pleurisy, abscess, and eczema.

Invaliding.—Thirty-three cases, in the ratio of 89.67 per 1,000 of cases treated, were invalided from the service; for the previous year the ratio was 170.13. The causes were as follows: Syphilis, 8; gonorrhea, 5; malarial cachexia, pneumonic tuberculosis, melancholia, neurasthenia, and fracture, 2 each, and remittent fever, anæmia, mania, corneal ulcer, retinitis, chronic myalgia, gonorrheal arthritis, chancroid, orchitis, and hernia, 1 each. Several of these cases remained from the previous year, and three were transferred to the Government Hospital for the Insane.

Mortality.—There were 5 deaths, 2 from pneumonia and 1 each from typhoid fever, carcinoma, and broncho-pneumonia. There were 12 cases of pneumonia under treatment during the year, 6 of typhoid fever, 2 of carcinoma, and 1 of broncho-pneumonia. The death rate per 1,000 of cases under treatment was 13.59; for previous year 11.34.

Venereal diseases.—Forty-four cases of gonorrhea, 30 of secondary and 10 of primary syphilis, 15 of inguinal adenitis, 10 of chancroid, 5 each of gonorrheal arthritis, orchitis, and urethral stricture, 2 of epididymitis, and 1 of cystitis were admitted during the year. Eight cases of syphilis, 5 of gonorrhea, and 1 each of gonorrheal arthritis, chancroid, and orchitis were invalided.

Injuries and poisons.—Nineteen cases of local injuries (5 cases of fracture, 4 of hernia, 3 of wounds, 2 of frostbite, and 1 each of concussion, contusion, deformity, muscular rupture, and sprain) and one case of alcoholism were admitted. There were no deaths under this class. Two cases of fracture and 1 of hernia were invalided.

NAVAL HOSPITAL, NEWPORT, R. I.

(*Statistics.*)

Surgeon LUCIEN G. HENEBERGER, U. S. N., *In charge.*

There were 497 cases treated during 1899, of which 482 were admitted during the year and 15 remained from 1898. The number treated was 259 greater than that of the previous year. The average number daily under treatment was 30.19; previous year, 13.98. The average number of days' treatment per case was 22.18; previous year, 21.44. Of the cases admitted 86 were for epidemic catarrh, 58 for mumps, 49 for typhoid fever, 46 for tonsilitis, 44 for pneumonia, 30 for bronchitis, 14 for scarlet fever, 13 for intermittent fever, 9 for articular rheumatism, 7 for remittent fever, 4 each for appendicitis, bronchial catarrh, pleurisy, cellulitis, and furuncle, and 3 each for otitis and nephritis.

Invaliding.—Sixteen cases were invalided from the service, being at the rate of 32.20 per 1,000 of cases treated; previous year, 16.81. The causes were: Epilepsy and hernia, 2 each, and effects of scarlet fever, vertigo, choroiditis, chronic bronchitis, contraction (tendon), myalgia, abscess, ecthyma, eczema, nephritis, syphilis, and urethral stricture, 1 each.

Mortality.—There were 11 deaths; 8 from pneumonia, 2 from typhoid fever, and 1 from intestinal obstruction. The rate per 1,000 of cases under treatment was 22.13; previous year, 12.61.

Venereal diseases.—Four cases of secondary and 1 of primary syphilis and 3 of gonorrhea were admitted during the year. There were also admitted 7 cases of bubo, 4 of epididymitis, 2 each of orchitis and venereal wart, and 1 each of cystitis and urethral stricture. Two cases under this class were invalided from service.

Injuries and poisons.—Ten cases of fracture, 5 each of sprain and hernia, 4 of contusion, 3 of wounds, 2 each of luxation, dermatitis (poison), and burn, and 1 each of drowning, foreign body, and alcoholism were admitted. Two cases under this class were invalided from the service.

NAVAL HOSPITAL, BROOKLYN, N. Y.

(*Statistics.*)

Medical Director GEORGE W. WOODS, U. S. N., *In charge.*

During 1899 there were 727 cases under treatment, 625 having been admitted during the year and 102 having remained from the year 1898. The total number of cases treated was 246 less than in the previous year. Of the 625 admissions, 34 were for articular rheumatism, 25 for pneumonic tuberculosis, 17 for tonsilitis, 16 for pneumonia, 15 each for measles and scarlet fever, 13 for bronchitis, 9 for erysipelas, 8 each for melancholia, valvular heart trouble, myalgia, and abscess; 7 each for epilepsy, appendicitis, chronic gastric catarrh, and nephritis; 6 each for remittent fever, simple continued fever, and pleurisy; 5 each for hemorrhoids, lymphadenitis, and synovitis; 4 for palpitation of heart, and 3 each for typhoid fever, intermittent fever, sea sickness, neuralgia, neurasthenia, conjunctivitis, myopia, otitis, varix, arthritis, and ulcer. The average number of cases daily under treatment was 71.77; for previous year, 99.74. The average number of days' treatment per case was 36.03; for previous year, 37.41.

Invaliding.—One hundred and fifty-six cases were invalided from service, the ratio per 1,000 of cases under treatment being 214.58. The ratio for the previous year was 268.24. The causes of invaliding were as follows: Pneumonic tuberculosis, 22 cases; syphilis, 13; articular rheumatism, 8; valvular disease of heart, adenitis, and melancholia, 7 each; gonorrheal arthritis and hernia, 5 each; epilepsy and bronchitis, 4 each; pleurisy, myopia, gastric catarrh, fracture, and abscess, 3 each; erysipelas, laryngitis, sea sickness, vertigo, iritis, otitis, palpitation of heart, gonorrhea, nephritis, varicocele, luxation, and gunshot wound, 2 each, and tænia, effects of typhoid fever, intermittent fever, effects of pneumonia, senile debility, pseudoleucocythemia, aphasia, dementia, pneumothorax, ankylosis, contractura, myalgia, osteomyelitis, periostitis, pemphigus, ulcer, chancroid, neuritis, hysteria, amaurosis, astigmatism, hypermetropia, constipation, diarrhea, hemorrhoids, icterus, tonsilitis, varix, asthma, enuresis, orchitis, contusion, deformity, foreign body, and alcoholism, 1 each. Seven of these cases were transferred to the Government Hospital for the Insane.

Mortality.—There were 16 deaths—3 from pneumonic tuberculosis, 2 each from pneumonia, scarlet fever, and appendicitis, and 1 each from valvular disease of the heart, aneurism, nephritis, secondary syphilis, carcinoma, burn, and luxation (vertebral). The rate per 1,000 of cases under treatment was 22.01; for previous year, 32.89.

Venereal diseases.—Forty-seven cases of secondary and 1 of primary syphilis, 18 of gonorrhœa, and 12 of chancroid were admitted during the year, and also 49 of bubo, 16 of epididymitis, 8 each of gonorrhœal arthritis and urethral stricture, 7 of orchitis, and 1 of balanitis. Twenty-nine cases were invalided under this class.

Injuries and poisons.—Sixteen cases of hernia, 15 of fracture, 10 of wounds, 8 of contusion, 7 of burn, 4 each of sprain and luxation, 2 of deformity, and 1 each of foreign body and frostbite were admitted during the year, and also 4 cases of alcoholism.

NAVAL HOSPITAL, PHILADELPHIA, PA.

(*Statistics.*)

Medical Director ROBERT A. MARMION, U. S. N., *In charge.*

One hundred and eighty-seven cases were admitted during the year and 49 remained from 1898, making the total number under treatment 236, a decrease of 202 when compared with the previous year. Of those admitted 11 were for epidemic catarrh, 6 each for articular rheumatism and bronchial catarrh, 5 each for typhoid fever, pneumonia, and tonsilitis, 4 for simple continued fever, 3 each for remittent fever, mumps, pneumonic tuberculosis, anal fistula, hæmorrhoids, and lymphadenitis, and 2 each for intermittent fever, neurasthenia, sciatica, appendicitis, gastric catarrh, myalgia, periostitis, and ulcer. The average number daily under treatment was 20.72; previous year, 35.53. The average number of days' treatment per case was 22.72; previous year, 29.61.

Invaliding.—Twenty-nine cases were discharged from the service for disability, the ratio per 1,000 cases treated being 122.88; previous year, 141.55. The causes of invaliding were: Hernia and syphilis, 4 cases each; pneumonic tuberculosis and gonorrhœa, 3 each, and articular rheumatism, diabetes, optic neuritis, anal fistula, hæmorrhoids, tonsilar hypertrophy, arteriosclerosis, palpitation of heart, hæmoptysis, pleurisy, chancroid, cystitis, urethral stricture, lacerated wound, and gunshot wound, 1 each.

Mortality.—There were 2 deaths—1 due to hemiplegia and the other to chronic hepatitis. The death rate was 8.47 per 1,000 of cases treated; previous year, 11.42.

Venereal diseases.—Twenty-three cases of gonorrhœa, 7 of secondary and 1 of primary syphilis, and 7 of chancroid were admitted during the year, and also 7 cases of orchitis, 4 of bubo, 2 of urethral stricture, and 1 each of gonorrhœal arthritis and venereal wart. Nine cases under this class were invalided from service.

Injuries and poisons.—There were 8 cases of wounds, 7 of hernia, 3 each of fracture and contusion, 2 of sprain, and one of luxation admitted. Six cases under this class were invalided from service.

NAVAL HOSPITAL, WASHINGTON, D. C.

(*Statistics.*)

Medical Director ABEL F. PRICE, U. S. N., *In charge.*

There were 315 cases treated during 1899, of which 293 were admitted during the year and 22 remained from 1898. The number treated was 88 greater than that of the previous year. The average number daily under treatment was 18.24; previous year, 15.88. Of the cases admitted, 35 were for intermittent fever, 17 for remittent fever, 7 for tonsilitis, 6 each for gastric catarrh, bronchitis, and abscess, 5 each for pneumonic tuberculosis and intestinal catarrh, 4 each for epidemic catarrh, typhoid fever, simple continued fever, neurasthenia, pleurisy, and eczema, 3 each for mumps, articular rheumatism, and appendicitis, and 2 each for measles, heat prostration, rhinitis, diarrhœa, gastralgia, valvular heart disease, asthma, laryngitis, myalgia, and erythema.

Invaliding.—Sixteen cases were invalided from the service, being at the rate of 50.79 per 1,000 of cases treated; previous year, 105.73. The causes were tubercular disease 3, fracture 2, and diabetes, mania, melancholia, aneurism, necrosis, abscess, eczema, gonorrhœal arthritis, spermatorrhœa, syphilis, and hernia, 1 each. One of these cases was transferred to the Government Hospital for the Insane.

Mortality.—There were 2 deaths—1 from valvular heart disease and 1 from broncho-pneumonia. The rate per 1,000 of cases under treatment was 6.35; previous year, 13.22.

Venereal diseases.—Fifty-six cases of gonorrhœa, 12 of secondary and 5 of primary syphilis, and 6 of chancroid were admitted during the year. There were also treated 9 cases of bubo, 3 of cystitis, and 1 each of gonorrhœal arthritis, epididymitis, and urethral stricture. Two cases under this class were invalided from service.

Injuries and poisons.—Five cases of fracture, 4 of contusion, 3 of incised wound, 2 each of hernia and punctured wound, and 1 each of deformity, luxation, sprain, and contused wound were admitted. Five cases of alcoholism and 1 each of neurotic poisoning and poison wound were also under treatment. Three cases under this class were invalided from the service.

NAVAL HOSPITAL, NORFOLK, VA.

(*Statistics.*)

Medical Inspector NELSON M. FEREBEE, U. S. N., *In charge.*

Three hundred and sixty-six patients were under treatment during 1899, a decrease of 361 when compared with the previous year. Three hundred and two were admitted during the year and 64 remained from 1898. Among those admitted were 14 cases of epidemic catarrh, 12 of epidemic parotitis, 9 of bronchitis, 8 each of typhoid fever and pneumonic tuberculosis, 7 each of malarial disease and abscess, 6 of ulcus, 5 each of pneumonia, valvular disease of the heart, and epilepsy 4 each of neurasthenia and cellulitis, 3 each of measles, rheumatism, sciatica, otitis media, chronic gastric catarrh, hæmorrhoids, tonsilitis, and lymphadenitis. The average number of cases daily under treatment was 44.86; previous year, 53.66. The average number of days' treatment per case was 44.74; previous year, 26.94.

Invaliding.—Seventy-two cases were invalided from service, being at the rate of 197 per 1,000 of cases treated; previous year, 255.85. The causes were: Tubercular diseases, 6 cases; epilepsy, valvular heart disease, fracture, and hernia, 5 each; rheumatism, otitis media, and syphilis, 3 each; bronchitis, ulcer, chronic nephritis, deformity, and dementia, 2 each; and anæmia, simple continued fever, hemiplegia, meningitis, nausea marina, neuralgia, neurasthenia, sciatica, melancholia, amaurosis, conjunctivitis, hæmorrhoids, congestion of liver, varix, lymphadenitis, broncho-pneumonia, hæmoptysis, ankylosis, contractura, bubo, enuresis, epididymitis, prostatitis, myxoma, frostbite, extraneous body, and alcoholism, 1 each. Three of these cases were transferred to the Government Hospital for the Insane.

Mortality.—There were 4 deaths—2 from acute miliary tuberculosis and 1 each from pneumonia and valvular heart disease.

Venereal diseases.—Twenty-four cases of secondary and 3 of primary syphilis, 33 of gonorrhœa, and 7 of chancroid were admitted, and also 19 of bubo, 3 of cystitis, and 1 each of gonorrhœal arthritis, gonorrhœal ophthalmia, orchitis, and prostatitis. Under this class 7 cases were invalided.

Injuries and poisons.—Twenty-two local injuries and 1 case of alcoholic poisoning were admitted during the year. The injuries were: Hernia, 9 cases; fracture, 5; deformity, 3, and 1 each of frostbite, contusion, dislocation, stremma, and lacerated wound.

NAVAL HOSPITAL, PORT ROYAL, S. C.

(*Statistics.*)

Assistant Surgeon HENRY A. DUNN, U. S. N., *In charge.*

Sixteen patients were under treatment in this hospital during the year 1899. The average number daily under treatment was 1.39, and the average duration of treatment per case, 31.81 days. Of the cases admitted there were 2 each for pneumonic tuberculosis, gonorrhœa, syphilis, and lacerated wound, and 1 each for acute dysentery, pneumonia, chronic myalgia, bubo, gonorrhœal arthritis, chancroid, orchitis, and hernia. One case was invalided from the service for hernia, and there was 1 death from pneumonic tuberculosis.

NAVAL HOSPITAL, PENSACOLA, FLA.

(*Statistics.*)

Passed Assistant Surgeon **WILL F. ARNOLD**, U. S. N., *In charge.*

Eighteen cases were under treatment during the year, a decrease of 24 when compared with the previous year; 17 were admitted and 1 remained from 1898. Among those admitted were: Chronic pneumonic tuberculosis, synovitis, bubo, and chancroid, 2 cases each; and peritonitis, tonsilitis, abscess, gonorrhœal arthritis, cystitis, epididymitis, gonorrhœa, orchitis, and fracture, 1 each. One case of acute nephritis remained from 1898. The average number of cases daily under treatment was 2.75; previous year, 2.56. The average number of days' treatment per case was 55.83; for the previous year, 22.24. Two cases were invalided from service, 1 each for peritonitis and acute nephritis. There were no deaths and no cases transferred to the Government Hospital for the Insane.

NAVAL HOSPITAL, MARE ISLAND, CAL.

(*Statistics.*)

Medical Inspector **GEORGE P. BRADLEY**, U. S. N., *In charge.*

Three hundred and six cases were admitted during 1899 and 24 remained from 1898, the total number under treatment during the year being 334, a decrease of 91 when compared with the previous year. Among those admitted were: 17 cases each of pneumonic tuberculosis and articular rheumatism, 9 each of measles, neurasthenia, and rubella, 6 each of epilepsy, and bronchitis, 5 each of malarial disease, dementia, mania, melancholia, and chronic gastric catarrh, 4 each of pneumonia, valvular heart disease, and bronchopneumonia, 3 each of typhoid fever, otitis media, dyspepsia, hæmorrhoids, varix, asthma, ankylosis, and periostitis. The average number daily under treatment was 41.52; for the previous year 40.13. The average number of days' treatment per case was 45.37; for the previous year 34.47.

Invaliding.—One hundred and twenty-seven cases were invalided from service, the ratio per 1,000 of cases under treatment being 380.24, while that for the previous year was 247.06. The causes of invaliding were: Hernia, 21 cases; pneumonic tuberculosis, 11; heart disease, and syphilis, 7 each; articular rheumatism, dementia, epilepsy, and melancholia, 5 each; neurasthenia, otitis media, asthma, ankylosis, and deformity, 3 each; senile debility, nausea marina, periostitis, synovitis, gonorrhœal arthritis, and fracture, 2 each, and epidemic catarrh, tuberculosis, progressive muscular atrophy, neuralgia, neuritis, neurosis, heat prostration, sciatica, paranoia, amyotrophic lateral sclerosis, iritis, synechia, deafness, chronic rhinitis, chronic gastric catarrh, diarrhœa, hæmorrhoids, intestinal ulcer, aneurism, bronchopneumonia, bronchitis, arthritis, flat foot, chronic nephritis, prostatitis, varicocele, contusion, dislocation, punctured wound, gunshot wound, and neurotic poisoning, 1 each. Eleven of these cases were transferred to the Government Hospital for the Insane.

Mortality.—There were 6 deaths, 1 each from acute pneumonic tuberculosis, hemiplegia, secondary syphilis, carcinoma, concussion, and poisoning. The mortality rate per 1,000 of cases under treatment was 17.96, while for the previous year it was 23.53.

Venereal diseases.—Fourteen cases of secondary and 1 of primary syphilis, and 4 of gonorrhœa were admitted during the year, and also 5 cases of bubo, 4 each of gonorrhœal arthritis and epididymitis, 3 of orchitis, 2 of balanitis, and 1 each of urethral stricture and prostatitis. Eleven cases were invalided under this class.

Injuries and poisons.—Forty-nine local injuries and 5 cases of poisoning (alcoholism 4 and opium 1) were admitted during the year. Among the injuries were 19 cases of hernia, 6 of fracture, 4 each of contusion and stremma, 3 each of deformity and gunshot wound, and 2 each of burn and concussion.

NAVAL HOSPITAL, SITKA, ALASKA.

(*Statistics.*)

Surgeon Henry B. Fitts, U. S. N., *In charge.*

Twenty cases were under treatment during the year, a decrease of 12 when compared with the previous year. Among those admitted were: Epidemic catarrh, 3 cases, colic, 2, and 1 each of chronic dysentery, cerebro-spinal fever, acute pneumonic tuberculosis, chalazion, chronic gastric catarrh, carbuncle, clavus, ingrowing nail, bubo, primary syphilis, and punctured wound. The average number of cases daily under treatment was 0.82; for the previous year, 2.81. The average number of days' treatment per case was 150.50; for the previous year, 32.66. There were no cases invalided from service. There were two deaths, 1 each from cerebro-spinal fever and drowning.

NAVAL HOSPITAL, YOKOHAMA, JAPAN.

(*Statistics.*)

Surgeon Frank Anderson, U. S. N., *In charge.*

Sixty-seven cases were under treatment during the year, an increase of 21 when compared with the previous year; 59 were admitted and 8 remained from 1898. Among those admitted were 5 cases of anæmia, 4 each of typhoid fever and chronic pneumonic tuberculosis, 3 each of remittent fever, periostitis, and hernia, and 2 each of articular rheumatism, epilepsy, asthma, and secondary syphilis. The average number of cases daily under treatment was 9.43; for the previous year 7.65. The average number of days' treatment per case was 51.37; for the previous year, 60.70. There were no deaths and no cases invalided from the service.

NAVAL HOSPITAL, CAVITE, P. I.

(*Statistics.*)

Medical Inspector James R. Waggener, U. S. N., *In charge.*

Three hundred and thirty cases were under treatment in this hospital during the 278 days it was in commission, its first patients having been received on March 27, 1899. Among those admitted were 32 cases of malarial disease, 24 of simple continued fever, 19 of dysentery, 12 of measles, 11 of typhoid fever, 8 each of articular rheumatism and heart disease, 7 of myalgia, 6 of dengue, 5 of pneumonia, 4 each of pneumonic tuberculosis, diarrhœa, bronchitis, and ankylosis, and 3 each of smallpox, neurasthenia, and multiple neuritis. The average number daily under treatment was 30.08, and the average number of days' treatment per case, 25.34.

Invaliding.—Ten cases were invalided from service, being at the rate of 30.30 per 1,000 of cases treated. The causes were: Heart disease, 3 cases; hernia, 2; nostalgia, varix, secondary syphilis, carcinoma, and dislocation, 1 each.

Mortality.—There were 7 deaths, 2 each from gunshot wounds and alcoholism, and 1 each from smallpox, appendicitis, and chronic intestinal catarrh. The ratio per 1,000 of cases treated was 21.21.

Venereal diseases.—Thirteen cases of secondary and 2 of primary syphilis, 8 of chancroid and 4 of gonorrhœa were admitted, and also 21 of bubo, 3 of epididymitis, and 1 each of gonorrhœal arthritis, orchitis, and urethral stricture. Under this class 1 case was invalided from service.

Injuries and poisons.—Forty-three local injuries and 5 cases of poisoning (alcoholism, 2 cases, and poisoned wounds, 3) were admitted during the year. Among the injuries were 18 cases of gunshot wound, 8 of hernia, 7 of fracture, 2 of stremma, and 1 each of burn, concussion, contusion, dislocation, ruptured tympanic membrane, incised wound, and lacerated wound. Three were invalided from service and 2 died.

FORCE AFLOAT.

Statistics.

The average strength of the force afloat during the year 1899 was 15,982, distributed as follows:

North Atlantic Station, 6,588; South Atlantic Station, 423; Pacific Station, 2,463; Asiatic Station, 4,652, and receiving ships, 1,856.

Seventy-nine per cent of the total force of the Navy and Marine Corps was afloat during the year 1899, as against 78 per cent for 1896, 80 per cent for 1897, and 84 per cent for 1898. The average number of admissions to the sick list per man on the cruising vessels of the North Atlantic Station was 0.69; on those of the South Atlantic Station, 1.07; those of the Pacific Station, 0.71, and on those of the Asiatic Station, 0.90. The ratios for the previous year were: North Atlantic, 0.93; Pacific, 0.88, and Asiatic, 0.78, the South Atlantic Station not furnishing statistics in 1898, as its ships were withdrawn by reason of the war with Spain.

The admissions for general infectious diseases (nonvenereal) were in the ratio of 117.01 per 1,000 of force, as against 167.65 for 1898; diseases of the nervous system, 62.45 (previous year, 92.24); diseases of the digestive apparatus, 129.90 (previous year, 149.62); diseases of the respiratory apparatus, 44.48 (previous year, 66.41), and of venereal diseases and diseases of the genito-urinary apparatus, 112.44, as against 91.47 for 1898.

The deaths numbered 56, which is in the ratio of 3.50 per 1,000 of force, a decrease as compared with the ratio for 1898, when it was 3.74 per 1,000.

The number invalided from the service was 54, a ratio per 1,000 of force of 3.38; for previous year, 6.26.

There were 1,717 transfers to hospital, giving a ratio of 107.43 per 1,000, as against 143.30 for 1898.

NORTH ATLANTIC STATION.

(*Statistics.*)

This squadron was composed of 56 vessels, the mean force of which, corrected for time, was 6,588. There were 4,541 admissions to the sick list, giving as the ratio per 1,000 of force 689.28, which for the previous year was 938.17.

There were 16 deaths in the squadron during the year, a mortality of 2.43 per 1,000 of force; for previous year, 3.46. The causes of deaths were as follows: Drowning, 9, and remittent fever, acute miliary tuberculosis, œdema of glottis, valvular disease of heart, carcinoma, concussion, and fracture, 1 each.

The principal diseases causing admissions to the sick list were malarial affections, 329; diarrheal affections, 238; rheumatic affections, 204; epidemic catarrh, 122; typhoid fever, 19, and pneumonia, 20.

SOUTH ATLANTIC STATION.

(*Statistics.*)

Two vessels comprised the South Atlantic Squadron during the year 1899, with a mean force, corrected for time, of 423.

There were 453 admissions to the sick list, giving a ratio of 1,070.22 per 1,000 of mean strength.

There was one death on this station during the year, and the cause was valvular disease of the heart. The death rate per 1,000 of force was 2.36.

There were admitted to the sick list during the year 57 cases of diarrheal affections, 27 cases of bronchial diseases, 26 of epidemic catarrh, 25 of rheumatic affections, 10 of malarial diseases, and 74 of venereal diseases and diseases of the genito-urinary apparatus.

PACIFIC STATION.

(*Statistics.*)

There were 17 cruising vessels employed on the Pacific Station, and the mean force, corrected for time, was 2,463.

There were 1,744 admissions to the sick list, a ratio of 708.08 per 1,000 of force. The ratio for the previous year was 880.46.

The vessels of this station reported 7 deaths during the year, giving a ratio of 2.84 per 1,000, as against 2.18 for 1898. The causes of death were as follows: Gunshot wounds, 6, and apoplexy, 1.

The principal diseases causing admissions to the sick list were epidemic catarrh, 139; rheumatic affections, 74; malarial diseases, 57; diarrheal affections, 57; typhoid fever, 7, and venereal diseases and diseases of the genito-urinary apparatus, 250.

ASIATIC STATION.

(*Statistics.*)

Twenty-five ships constituted the Asiatic Squadron during the year 1899, with a mean force, corrected for time, of 4,652.

The total number of admissions to the sick list was 4,197, affording a ratio of 902.19 per 1,000 of force. The ratio for the previous year was 783.36.

There were 26 deaths on the ships of this squadron during the year, giving a ratio of 5.59 per 1,000 of force, as against 5.94 for 1898.

The causes of death were as follows: Gunshot wounds, 7; fracture, drowning, and smallpox, 3 each; alcoholism, 2, and typhoid fever, broncho-pneumonitis, pneumonia, acute articular rheumatism (hyperpyrexia), chronic pulmonary tuberculosis, meningitis, thermic prostration, and asphyxia (bilge gases), 1 each.

The principal diseases causing admissions to the sick list were:

Malarial diseases, 339; thermic and simple continued fevers, 260; rheumatic affections, 262; diarrhea, 201; bronchial affections, 98; thermic prostration, 73; gunshot wounds, 31; phthisis, 28; dengue, 28; neurasthenia, 22; anæmia, 18; dysentery, 16; typhoid fever, 12; measles, 8; smallpox, 4, and venereal diseases and diseases of the genito-urinary apparatus, 741.

RECEIVING SHIPS.

(Statistics.)

During the year the receiving ships had a mean complement of 1,856, a decrease of 498 when compared with the year 1898. The total number of admissions to the sick list was 882, a ratio per 1,000 of force of 475.22; for previous year, 639.76. There were 6 deaths, distributed as follows: *Wabash* 1, cause asphyxia; *Vermont* 1, cause drowning; *Richmond* 2, causes apoplexy and valvular disease of heart; *Franklin* 1, cause valvular heart disease, and *Independence* 1, cause myocarditis.

During the year there were admitted to the sick list 68 cases of malarial disease, 53 of rheumatic affections, 43 of bronchial affections, and 144 of venereal diseases.

The receiving ships transferred to hospital 242 patients and invalided from the service 14 cases.

NAVY-YARDS, MARINE BARRACKS, AND OTHER SHORE STATIONS.

Statistics.

The various navy-yards and other shore stations had a mean force during the year of 3,684.

The total number of admissions to the sick list was 3,653, a ratio of 991.59 per 1,000. The ratio for the previous year was 855.34.

The prevalence of special diseases was as follows: Malarial affections, 248; typhoid fever, 68; dysentery, 45; dengue, 279; yellow fever, 8; measles, 13; articular rheumatism, 73, and pneumonia, 43.

Fourteen persons were invalided from the service—4 for epilepsy, 2 each for deformity and hernia, and 1 each for malarial cachexia, valvular disease of the heart, emphysema, ankylosis, arthritis, and synovitis.

There were 420 cases of injury admitted to the list, 25 of which were due to gunshot wounds.

The deaths were 27 in number, the causes being as follows: Typhoid fever, 7; yellow fever, 4; drowning, 4; chronic hepatitis, 2; and 1 each from chronic dysentery, cerebro-spinal fever, pneumonia, remittent fever, septicæmia, apoplexy, valvular disease of the heart, fracture, gunshot wound, and poisoned wound.

The death ratio per 1,000 of force was 7.33, as against 5.67 for the previous year.

SELECTED MEDICAL, SURGICAL, AND SANITARY NOTES FROM SHIPS, SHORE STATIONS, AND HOSPITALS.

SHIPS.

U. S. S. ABARENDA.

(*Note.*)

EDWARD M. BLACKWELL, *Assistant Surgeon.*

Arthritis.—A coal passer, aged 22, was admitted to the list July 15 with great swelling of the right upper extremity from the wrist to the shoulder. The glands in the axilla and about the elbow were enlarged, and red lines in the skin marked the distribution of the lymphatic vessels. The pulse was rapid and the temperature ranged from 100° to 102° F. Quinine sulphate and tincture of the chloride of iron were administered, and different applications were made, such as ointment of ichthyol, lead and opium lotion, etc. Blisters were applied, and incisions made in the region of the greatest swelling about wrist greatly relieved the tension. The bowels were moved freely with purgatives.

Following this treatment the swelling and pain left the arm and forearm, but remained in the wrist, where the motion ultimately became so much impaired that he was invalided from the service during the present year.

Pericarditis.—A landsman, aged 22, was admitted on July 24 with febris remittens. He had had a severe chill, followed by a temperature of 102.2° F., sweating, and rapid pulse. The next day his temperature rose to 105.5° F., and for some days there was an evening rise of 2° to 4°, with morning remissions, the fever decreasing gradually each day until the seventeenth day of the disease, when it reached the normal, with a slight rise of one-half to 1° in the evening. There was some enlargement of the liver and spleen.

The usual malarial remedies were used, and the temperature remained normal until the twenty-second day of the disease, when it rose to 102°, with rapid pulse and breathing and great dyspnœa.

An examination of the heart disclosed a friction sound, followed in a day or two by an increased area of dullness. During the next few days his temperature ranged from nearly normal to 104°. There was great dyspnœa and rapid breathing (45 per minute) and great pain over heart.

On the seventh day after his admission with pericarditis his temperature became normal and the pulse and breathing slowed, but on the fourteenth day the symptoms returned. After this the attacks recurred every few days, periodically, as if there was a malarial element in the case. As the patient did not improve, he was transferred to the Naval Hospital, Mare Island, where, on October 16, jaundice appeared. He remained under treatment until some time in December, when he was invalided from the service, greatly improved.

Vulnus contusum.—On August 30 a master-at-arms, second class, aged 29, fell into the forehold while unloading cargo, and sustained a contusion of left arm, a contused wound of side, and a wound of the scalp, horseshoe in shape and 10 inches in length. The flap turned back exposed about 20 square inches of the skull covered with its periosteum, and this latter was detached in places. The shock was marked.

The wound was thoroughly cleansed, loosely brought together with sutures, and dressed with bichloride gauze. He had no rise of temperature, and the wound healed in fifteen days.

The wound of the side was just back of and below the posterior boundary of the axilla. It was 2 inches long and had almost the same depth, and a section of the latissimus dorsi muscle, about 1 inch wide, was cut. This was cleansed and brought together with quilled sutures, and was entirely healed by the twentieth day. The injury to the arm was, however, followed by extensor paralysis—wrist drop due to injury of the musculo-spiral nerve. Improvement in this condition occurred, and he was able to resume his duties.

U. S. S. CELTIC.

(*Note.*)

Warren E. G. High, *Assistant Surgeon.*

Asphyxia.—On April 17 a coal passer was asphyxiated by the gases liberated by a disturbance of the bilge water. He was engaged in cleaning the bilge, when the ship listed suddenly. He was working at some distance from the manhole plate when overcome, and owing to the construction of the bilge spaces it was not possible to remove him for some little time—perhaps twenty minutes—but death had occurred. Other men who had been working in the bilge at the same time complained of severe headaches lasting for several hours.

U. S. S. CHARLESTON.

(*Note.*)

Henry T. Percy, *Surgeon.*

Bronchopneumonitis.—On December 22 a fireman, second class, was admitted to the sick list complaining of pain and a feeling of tightness in the chest, weakness, and general malaise. Bronchial râles were heard over both lungs. Under appropriate treatment the condition of the patient remained much the same until December 27, the date of sailing, when he became much worse. An examination revealed an invasion of the smaller bronchi, accompanied by hurried and labored breathing, rapid and weak pulse, and frothy hemorrhagic sputa. Expectoration ceased the following day, and the kidneys persistently refusing to function, his condition became grave and the patient steadily sank until January 4, at 9.10 a. m., when death occurred in spite of the free use of stimulants and of careful watching and nursing. The case being a typical one, an autopsy was considered unnecessary.

U. S. S. CHICAGO.

(Note.)

HOWARD WELLS, *Medical Inspector.*

Glottidis œdema.—A landsman, age 21, was admitted on November 17, with the left tonsil enlarged and follicles greatly distended. His condition remained unchanged until the 19th when the left side of neck was found to be swollen and the uvula œdematous. There was slight difficulty in breathing, relieved by incision into the affected tonsil. On the following day the difficulty in breathing returned and there was moderate cyanosis with an increase in the swelling of the neck. This was quickly followed by complete occlusion of the air passages. The obstruction was temporarily relieved by the finger and respiration restored. Preparations were at once made for tracheotomy, but the patient suddenly had another spasm of the glottis and died almost immediately. The direct cause of death was œdema of the glottis.

U. S. S. CONCORD.

(Note.)

AMMEN FARENHOLT, *Passed Assistant Surgeon.*

Vulnus sclopeticum.—An apprentice, second class, was one of a party that went ashore on liberty from this ship at Kabalitian Island, Lingayen Gulf, Philippine Islands, during the afternoon of September 3. At about 2.20 p. m., while several of his shipmates were firing with rifles, he was accidentally shot in the head. The rifle used was a Spanish Mauser, 7 mm. caliber, and the distance not over 2 feet. His hat was blown off by the discharge, and turning sharply to the right he fell. Consciousness was immediately lost and never regained. When seen there had been profuse hæmorrhage from both wounds of a perforating gunshot injury of the skull; pulse week and rapid, breathing stertorous, pupils equal and sluggish, slight movements of arms and forearms, chiefly the right, and fæces evacuated. Stimulants were given repeatedly, but he steadily sank, and died a little over two hours after the receipt of the injury. Stimulation, intravenous injection, and other measures but delayed the fatal issue. The following conditions were observed after death: The wound of entrance admitted the little finger to first joint; the wound of exit was of the same size. There were no powder stains. There was an exophthalmos of left eye; the pupils were equal and moderately contracted, and there was considerable movement on pressure of the cranial bones under the scalp. The anterior or wound of exit was 9½ cm. above the nasion and in the median line of the frontal bone, while that of entrance was in the center of the right parietal bone. There was extra cranial hæmorrhage in the line of wounds, the coronal suture was patent, and the fractures extended from the posterior to anterior wounds, and about 8 cm. beyond each. There was considerable intracranial hæmorrhage, and the brain substance was disintegrated along the path of the bullet and into the surrounding tissue through a diameter of 5 cm. The injury was chiefly to the right hemisphere except near the anterior wound where the left was involved. The surfaces of both hemispheres were injected. The base was apparently undisturbed.

U. S. S. EAGLE.

(Note.)

CHARLES A. CRAWFORD, *Assistant Surgeon.*

Sanitary regulations governing working parties.—The *Eagle* was engaged from January 25, 1900, until July 17 in making a survey of Guantanamo Bay, Cuba. During that period there were no cases of malarial fevers, and the health of the ship was very good. The survey parties, after a liberal breakfast, began work at 7.30 a. m. and returned to the ship at noon. In the afternoon work was resumed at 2 p. m. and continued until 5.30 p. m.

The following were the additional sanitary regulations prescribed:

1. Awnings will be spread in the boats when practicable, and men will not expose themselves unnecessarily in the sun during the heat of the day.
2. Parties leaving the ship must provide themselves with fresh water, and no shore water is to be used for drinking purposes.
3. Wet shoes and socks will be removed and cleansed of mud upon getting into the boats or immediately upon return to the ship.
4. When suffering even slightly from headache, pains in the back, chill, or dizziness, report at once to the medical officer.
5. Miscellaneous eating of fruit is prohibited, and only such will be allowed as is brought on board and inspected by the medical officer.
6. Sleeping in damp clothing or upon the decks where they are not well protected by awnings is prohibited.
7. Flannel underclothes will always be worn beneath the working clothes.
8. Working parties will return to the ship at least one-half hour before meals.
9. Swimming will be allowed in the early morning before breakfast, between 4 p. m. and supper time, and after 6.30 p. m. A limited amount of fresh water will be allowed for washing when available.
10. If poisoned by ivy on shore, do not rub the spot, but report to the medical officer.
11. The main deck will be scrubbed only on Saturday morning or when ordered, and no salt water scrubbing will be permitted between decks.
12. The master-at-arms will see that the cooking utensils are well scalded after meals and that no scraps are left below.

U. S. S. HARTFORD.

(Note.)

EDWARD R. STITT, *Passed Assistant Surgeon.*

Comparative physiques of recruits, East and West.—In connection with the physical examination of the landsmen received from the *Richmond* and *Vermont* on the arrival of this ship from the Pacific station, a great superiority has been observed as regards the outward manifestations of a sound physique among those born in the Middle West over the natives of the Atlantic coast.

There were noted among the recruits from the Eastern cities a large number of cases of persons who would probably develop unfitness for the service by reason of catarrhal conditions of throat and nose, as well as from relaxation of inguinal rings; these conditions being far less frequent among the recruits from the Western States.

While the most striking feature differentiating the two classes was as regards general appearance, yet the following averages, obtained from measurements, are in a degree indicative of this superiority: Of 163 men, natives of the Eastern coast cities, the averages were, age, 20.3 years; weight, 129 pounds; height, 66 inches; chest expansion, 3.2 inches; circumference of arm, 11 inches, and circumference of thigh, 19 inches.

Among those born in the Middle West, numbering 92, the average was 20.5 years; average weight, 135 pounds; average height, 67 inches; average chest expansion, 3.4 inches; average circumference of arm, 11.5 inches, and average circumference of thigh 19.5 inches.

Of the 251 recruits who were enlisted for this ship about one year ago, all coming from the West, the following averages pertained at time of first examination: Age, 21 years; weight, 139 pounds; height, 66.6 inches; chest expansion, 3.2 inches; circumference of arm, 11.7 inches, and circumference of thigh, 19.7 inches.

U. S. S. HELENA.

(*Note.*)

Lewis Morris, *Passed Assistant Surgeon.*

Fractura.—On the 28th of October, 1898, while coaling ship in Boston, a seaman, aged $22\frac{5}{12}$, trod on a large piece of coal and turned his right ankle. He was admitted to the sick list on the same day, with much pain, swelling and tenderness about the external malleolus, together with discoloration of the surrounding parts. In a few days a plaster dressing was applied. The parts were then still swollen and extremely painful. There was no deformity other than symmetrical swelling, but as examinations caused much pain, and the ship was at sea, it was thought best to secure complete immobility. The swelling gradually disappeared, but extreme tenderness remained, and crepitus below and posterior to the internal malleolus was apparent as late as December 10. When the dressing was removed (February 9, 1899) the whole limb commenced trembling. The parts seemed to be normal, but there was pain below and posterior to the external malleolus. The trembling of the limb continued for some hours, when violent paroxysms of severe and shooting pains, starting at the hip and following the course of the sciatic nerve, commenced, and recurred at frequent intervals. These paroxysms would last a few seconds at a time, and then would stop with a violent flexion of the knee and excruciating pain in the popliteal space. This continued for three hours, the patient at times being thrown into opisthotonos. Under appropriate medication he was eventually quieted and slept until 2 a. m. of February 10, when the trembling of the limb recurred, but no paroxysms appeared until 9 a. m. On entering Singapore Harbor, on the same day, the firing of a salute awakened the patient from a sleep and the paroxysms recommenced. The patient was transferred to hospital for further treatment, and during the stay of this ship in port he had trembling of the affected limb from weakness, but no more acute paroxysms, which were probably associated with hysterical tendencies. He ultimately recovered and returned to duty.

U. S. S. INDEPENDENCE.

(*Note.*)

ANDREW R. WENTWORTH, *Surgeon.*

Cordis dilatatio et ruptio.—A seaman, age $54\frac{9}{12}$, died suddenly on the morning of January 30. He was washing canvas at the time and was seen to fall suddenly backward, expiring almost immediately. The deceased had served twenty years in the Navy and appeared to be in good health up to the time of his death. An autopsy revealed a rupture of the right auricle. The heart was twice the usual size, fatty and friable throughout, and the walls of the auricle had become as thin as tissue paper.

Venenum neuroticum.—On the morning of December 30, a private marine, while recovering from the effects of an alcoholic debauch, accidently swallowed a portion of a solution of oxalic acid contained in a mess bowl which the ship's cook had put in the galley preparatory to cleaning the "coppers." The patient, thinking the bowl contained coffee, swallowed a mouthful before discovering his mistake. He was seen immediately and an emetic and the usual antidotes given. The case resulted in recovery. It was recommended that the use of a poison for such purposes be prohibited.

U. S. S. MANILA.

(*Note.*)

JAMES S. TAYLOR, *Assistant Surgeon.*

Catarrhus epidemicus.—Between April 25 and May 30 there were 51 admissions to the sick list and 5 readmissions for a febrile affection which was eventually considered to be epidemic catarrh or influenza. In addition there were 6 similar cases among officers and men who, from the mildness of the attack, were not admitted to the sick list. In the first two cases a diagnosis of malaria was made, partly from recurrence of chills of a quartan type and distinct remission of fever and partly from a history of previous paludal attacks. As cases began to multiply, it was concluded that an epidemic existed, and after careful study it was decided to be catarrhus epidemicus. The malady began suddenly with fever—103° to 104° F.—sometimes accompanied by a chill, with great disturbance of the stomach, headache, backache, general rheumatic pains, and marked prostration. The fever abated in from two to five days, while the acute distress continued from eight to ten days. In some cases febrile disturbance was absent, but the distaste for food, the nausea and vomiting, the utter prostration, and more or less anæmia were present in all cases. The following complications existed in a few cases: Conjunctivitis, acute bronchitis, congestion of the middle ear, erythema, herpes, and vertigo. There was no enlargement of the spleen. The conspicuous features were the gastric disturbance and the prostration, which were out of all proportion to the severity of the other symptoms. The treatment was directed chiefly to the relief of pain and support of the physical powers.

The desirability of giving to the officers and men affected an opportunity to recuperate their strength by a complete change of climate and surroundings was recommended, more particularly for those liable to have duty in these waters for some time.

U. S. S. MONTGOMERY.

(*Note.*)

ALBERT M. D. MCCORMICK, *Passed Assistant Surgeon.*

Venenum neuroticum.—On May 25, a cockswain, aged 30$\frac{2}{12}$, returned from liberty and was noted as being a little under the influence of liquor. During the night he obtained some shellac mixture, the alcohol from which he drank. He failed to turn out when all hands were called on the morning of the 26th and was found to be in an unconscious condition.

When seen by the medical officer at 5.45 a. m. he had apparently been dead a few minutes. An autopsy was performed at 7.30 a. m. The skin of face and neck was livid from passive congestion. The pericardium was two-thirds full of serous fluid; the heart hypertrophied and fatty, and the right cavities distended with blood. There was marked insufficiency of the mitral valve. The lungs were œdematous. The stomach contained an acrid fluid and the mucous membrane was congested. The liver appeared normal. The kidneys were large and showed the result of venous stasis.

The cause of death was thought to be heart failure, due primarily to the lesion of the mitral valve, but hastened by the abuse of alcohol, which overtaxed an already heavily burdened organ.

U. S. S. NASHVILLE.

(*Note.*)

FRANK L. PLEADWELL, *Passed Assistant Surgeon.*

Fractura.—On June 17 a coal passer engaged in pitching a baseball sustained a simple fracture of the right humerus from muscular action. At the time of the accident the patient was throwing an "out curve," the position being that necessary to produce a rapid rotation of the ball from right to left as it leaves the hand. While in the act of throwing the ball the patient's arm was seen to drop, and a sharp snap was heard by the onlookers within a radius of about 50 feet.

The patient was 22 years of age, well developed, and had no previous history of fracture. The fracture was slightly oblique, at about the junction of the middle with the lower third of the humerus, with little displacement. It was easily reduced, and was held in position by a temporary splint. He was transferred to the naval hospital, Pensacola, and was able to use his arm in light exercise on August 19. He was discharged to duty on September 11, with good union and no disability.

U. S. S. NEWARK.

(*Note.*)

AVERLEY C. H. RUSSELL, *Surgeon.*

Vulnus punctum (*right and left index fingers*).—A cockswain, aged 24, was admitted on July 5 with the diagnosis indicated. He had been bitten by a dog ashore and afterwards infected with venereal pus. There was a superficial abscess on the dorsum of the left forefinger, just above the nail. This was incised and the dead skin cut away. It healed after several weeks under antiseptic applications.

The wounds on the right forefinger were opposite the first interphalangeal joint. The one on the outer side of the joint developed deep suppuration in spite of prompt incision and antiseptic precautions, and infection of the lymphatic vessels and glands of the dorsum of the finger, hand, and arm ensued. The glands suppurated, and this was attended by chills, fever, and constitutional disturbance. The glands were freely incised, the pus evacuated by irrigation, and the cavities touched with crystalized carbolic acid. Seven incisions were made.

On the 15th of July a chancre was found on the integument of the penis and the inguinal glands were indurated. The edges of the incisions in the hand and arm were everted and indurated. Mercurial treatment was begun. A gland at the bend of the elbow and one under the clavicle became indurated, but they did not suppurate. Under specific and supporting treatment, local applications of iodoform and bichloride dressings, the sores on the forearm and hand healed, leaving rounded copper-colored scars. He was eventually discharged to duty.

Appendicitis.—A machinist, first class, aged 24, was admitted on August 8, having been taken sick on the night of the 7th with pain in the right iliac region, radiating to other parts of the abdomen. There was, on examination, acute tenderness on pressure over right iliac region. The abdominal muscles were rigid. He had been constipated for several days. On admission his temperature was 98.8° F.; pulse, 88. Absolute rest on back was ordered, and he was to have no food. Ice by mouth was given and an ice bag applied to the right iliac region continuously. In addition a half ounce of magnesium sulphate every half hour for four doses was ordered and moved the bowels freely. The temperature in the evening was 101° F.; pulse, 100. On August 9 his temperature was 99.8°; pulse, 90. Symptoms moderated. An emplastrum sinapis to the right iliac region diminished the pain and tenderness. His diet was restricted to beef extract. The temperature in the evening was 100.2°; pulse, 80. August 10, temperature, a. m., 99.2°; pulse, 72. The mustard plasters were repeated morning and afternoon. On the evening of the 10th a hypodermic injection of morphia, one-sixth grain, was given. August 11, temperature, a. m., 98.8°; pulse, 60; temperature, p. m., 98.8°; pulse, 58. August 12, temperature, a. m., 98.6°; pulse, 56. The indurated appendix could be clearly made out on palpation, as the abdominal muscles were relaxed. August 13, convalescent. He was given an enema containing turpentine every morning. The induration of the appendix gradually and completely disappeared. Discharged to duty well on August 29.

U. S. S. NEW ORLEANS.

(*Note.*)

FREDERICK J. B. CORDEIRO, *Surgeon.*

Rheumatismus articularis acutus.—An oiler, aged 36, was admitted June 18 with the typical symptoms of acute articular rheumatism, in which the various joints were attacked in succession, accompanied by high fever, sweating, and excruciating pain on the least movement.

The left knee became the seat of the severest attack, attended with so great an effusion as to semiflex the leg. This joint was aspirated in the morning, with the effect of reducing the temperature from 102° to the normal and giving almost complete relief for the time being.

A firm bandage was applied, which gave a feeling of comfort, whereas before the effusion was evacuated the slightest pressure could not have been borne. The patient moved his leg without pain, and shortly went to sleep.

In the evening the shoulders were attacked, and afterwards various joints repeatedly, with a return of the fever, but the aspirated joint throughout the sickness was not again attacked.

The medical treatment consisted in the use of salicylate of soda and the alkalies. The patient went to duty nine days after admission, perfectly well. Whether the surgical treatment of the joint had any effect in shortening the duration of the disease, it is impossible to say. It is certain, however, that the procedure gave immediate, though temporary, relief.

U. S. S. NEW YORK.

(*Note.*)

CHARLES U. GRAVATT, *Medical Director.*

Erysipelas.—A private marine was admitted February 20 with erysipelas, following a wound of the hand, and involving the whole arm.

Two cases preceded this one, one being admitted on January 26 and the other on February 3. Both the latter were sent to hospital.

In the present case the time elapsing between the reception of the wound and the development of the erysipelas was ten days. Extensive suppuration required multiple incisions.

Coincident with the foregoing cases, a number of men developed pharyngitis or tonsilitis. No new cases of these diseases developed after formalin disinfection of the living compartments and the clothing of the crew.

Syphilis consecutiva.—On December 3, a shipwright, aged 27, was admitted with secondary syphilis. The patient presented a profuse macular eruption on body, his hair was falling out, and glands were enlarged. Mercurial treatment was pursued.

He was readmitted February 2 with signs of syphilitic involvement of left pleura. Breathing was shallow and painful, with dry cough. Temperature, about 100° F. The left pleura anteriorly presented signs of thickening, vocal fremitus and resonance being markedly decreased. The respiratory sounds in this area were weak and distant; percussion note, dull. Only the pleura in anterior portion of left chest was involved. Posteriorly, on the left side, the pleura appeared to be normal. Potassium iodide, given in large doses, was soon followed by a subsidence of the process.

U. S. S. PHILADELPHIA.

(*Note.*)

GEORGE A. LUNG, *Passed Assistant Surgeon.*

Vulnus sclopeticum.—A private marine was found dead at his post in front of the American consulate, Apia, Samoa, at about 3 a. m., March 17. He had been put on post about 1 a. m., and was one of a guard protecting the consulate against an attack from certain hostile Samoans.

The remains were brought aboard the *Philadelphia* at daybreak, when, on a careful examination, it was found that he had been shot in the left shoulder, about 2 inches below the acromion process.

The bullet ranged into the front and upper part of the chest in an almost horizontal direction. The neck and head of the humerus were shattered and the large blood vessels at the base of the heart were divided. He had bled profusely from the mouth and nostrils. There was but one wound, that of entrance, and the appearance of that indicated a bullet of large caliber.

Vulnus sclopeticum.—On March 15 a private marine, aged 22$\frac{10}{12}$, while standing guard in the rear of the consulate at Apia, Samoa, was struck in the left leg by a fragment of a 6-inch shell.

This particular fragment passed through an outhouse and a cocoanut tree, struck the calf of the leg, and then buried itself in the ground a few feet beyond. The patient was brought on board very soon after the accident occurred. Almost the entire bodies of the gastrocnemius and soleus muscles were destroyed. About 3 inches of the middle third of the fibula was comminuted. Circulation in the anterior tibial artery was unimpaired and the tibia and the tissues on the sides and front were intact.

The patient said that when the shell struck him it knocked him down and he thought some of his companions were skylarking with him. In falling the wound came in contact with the soil and grass. The wound was treated antiseptically with a view to saving the leg.

His condition was very favorable until the noon of the 24th of March, when symptoms of tetanus set in. By night they had become pronounced and typical. As a last measure, on the morning of the 25th, amputation was performed just above the knee. He survived the operation seven hours, dying in a tetanic spasm.

U. S. S. VIXEN.

(*Note.*)

William H. Bell, *Assistant Surgeon.*

Sanitary rules for surveying parties.—In connection with working parties ashore on Vieque or Crab Island, the following sanitary precautions and rules were recommended:

1. That the camping site or sites be chosen by the chief of party and medical officer in consultation, and that in placing the camp they be governed by the following general rules:

(*a*) Camp should be pitched on dry soil with natural drainage, preferably land remote from and to windward of marshy ground or low, stagnant ponds, with hills or trees intervening, if possible.

(*b*) No site is to be used as a camp that has been used for the same purpose or as a habitation previously, and buildings shall not be used for quartering men unless urgently necessary.

2. That the sanitary regulations for the camp and its individual members be as follows, with such additional regulations as circumstances may require from time to time:

(*a*) No water, except that taken from the ship, shall be used for cooking or drinking purposes until after having been boiled for five minutes. Cooking utensils and dishes used to contain food should be washed in boiled water.

(*b*) The food will be the regular navy ration. Fruits and vegetables which are ripe and sound and which are skinned or cooked before eating are not objectionable and may be used. The men shall breakfast previous to any undue exposure and as soon as practicable after turning out. Meals shall be served as far as possible at regular hours, and warm.

(*c*) Latrines are to be established to leeward and below the camp, away from any water supply. Dry earth and chloride of lime are to be scattered over the contents of the pit every morning.

(*d*) All refuse from the camp shall be deposited in a chosen place and burned or buried in pits.

(*e*) The medical officer or attendant shall make a thorough inspection daily of all parts of the camp and report inattention of these regulations to the officer in command.

(*f*) A suitable change of clothing shall be provided. Clothing should be as light as possible during the day while at work, and when wet by rain or perspiration changed as soon as practicable. In no case should wet clothes be slept in.

(*g*) Men should not be permitted to sleep on the bare ground or without cover from the night dews, and if the mosquitoes are numerous and troublesome the men should be provided with nettings.

(*h*) When exposed to the hot sun the men should wear some fresh green leaves inside their hats, which should be preferably of straw and broad brimmed.

(*i*) During the heat of the day only absolutely necessary work should be done and excessive fatigue should be avoided. Bathing should not be allowed in the heat of the day or while the men are hot from exertion.

(*j*) Alcoholics of every description should be absolutely interdicted, except as prescribed by the medical officer in attendance.

U. S. S. WHEELING.

(*Note.*)

JOHN B. DENNIS, *Assistant Surgeon.*

Impetigo.—During the months of May and June an epidemic of impetigo contagiosa prevailed on this ship. There were 26 men under treatment. The source of infection was not definitely traced, but it is highly probable that the original case was contracted while ashore at the navy-yard, Cavite, P. I. The disease was most severe in those individuals who were anæmic and below par in their general health, consequent upon service in the Tropics. The parts of the body principally affected were the axillæ, abdomen, groins, thighs, forehead, and face. In several of the cases there was a slight febrile movement, the temperature reaching in one case 100.2° F., in others 99.5° F. In the most severe cases, after the crusts had fallen off, pinkish scars remained for three or four weeks. The average duration of each case was about three weeks.

SHORE STATIONS.

NAVAL STATION, SAN JUAN, P. I.

(*Note.*)

FRANCIS W. F. WIEBER, *Surgeon.*

Denguis.—During the fourth quarter of the year an epidemic of dengue occurred among the personnel of this station. During the entire year the disease had prevailed in the city of San Juan and in the army. The first case at the station developed on October 20. In the majority of cases the disease was ushered in by chilly sensations, which were followed by a rapid rise of temperature ranging from 101.4° F. to 105° F., the average being about 103° F. With this fever there existed malaise, pain in muscles of eyes, in the back, various joints, calves of legs, etc. The severity of these pains varied greatly; while some patients scarcely noticed them others felt them acutely. Gastric and intestinal disturbance, indicated by a coated tongue, poor appetite, and constipation, were present in all cases. After the first rise of temperature a remission occurred on the following day, with an exacerbation at night, the fever, however, steadily diminishing from day to day to show in most cases a final rise of one-half degree for part of a day, before the final drop to the normal on the fourth or fifth day.

The disease ran a course of from five to nine days and was followed by great debility, which lasted from a few days to several weeks. The urine was examined in all the hospital cases but with a negative result. A distinct primary eruption on face, arms, and legs was noticed in less than half the cases, and a secondary eruption on palms of hands and soles of feet in the majority of the cases. The latter eruption appeared about the fifth day of the disease. There were seven cases admitted to the list.

Venenum irritans.—A private marine, after having been drinking rather heavily for about a week, tried to shoot himself with a rifle on the morning of March 20. He was prevented from so doing by his roommates. Later he seized a 3-ounce bottle of a concentrated solution of oxalic acid and drained the same of its contents by drinking it. He then walked out of the room, was seen to gag, and walked on down the navy-yard in the direction of the water-closet. Men were immediately sent after him and within about five minutes of the time he had taken the poison he was back in his room, unconscious. A hypodermic injection of apomorphia was given, the lavage tube introduced into the stomach and the stomach washed out repeatedly. The patient was pulseless from the time he was carried back to his room, and antidotes and stimulants proved of no avail, the patient dying in less than half an hour after the poison had been taken. The exact amount taken is not known, but assuming that the bottle was full of the concentrated solution of oxalic acid, the size of the bottle would have allowed a solution of about 7 grams of the acid. The washings of the stomach answered the tests for oxalic acid.

NAVAL STATION, PUGET SOUND, WASHINGTON.

(*Note.*)

CHAUNCEY R. BURR, *Assistant Surgeon.*

Vulnus laceratum.—On October 7 a machinist, first class, while at work in a machine shop at a combined punch and shearing machine, was caught on the right cheek by a set screw attached to a movable part of the machine. The screw impinged on the outer angle of the orbit, and its movement being downward, the whole outer aspect of the orbit and cheek was torn away. The malar bone was torn from all its attachments save that with the zygoma, and, together with the structures composing the right cheek, was reflected outward. The zygoma was fractured at about its middle and the fragment, still connected with the malar bone, had perforated the cheek, and was exposed to the air for a distance of about an inch. The orbicularis palpebrarum was torn away from its attachment to the nasal process of the superior maxillary bone, and from the cheek as well, so that it hung downward as a mere ribbon of flesh. The outer aspect of the eyeball was thus completely exposed, but the eye itself was uninjured and its movements and vision were normal. The zygomatic and sphenomaxillary fossae were exposed, but the superior maxillary nerve, the inferior maxillary nerve, Meckel's ganglion, and the internal maxillary artery were not observed therein. The superior maxillary bone on that side appeared to have been sprung downward, for the upper teeth on the right side were on a lower level than those on the left. There was also a deep right-angled cut on the right frontal eminence which extended down to the bone. There was no arterial hæmorrhage, but the patient was in a condition of shock. With the scissors several broken fragments of bone were removed; the broken end of the zygoma was replaced. The wound was then irrigated with boiled water and three iodoform gauze drains so placed that one led to the under and back part of the orbit, one to the sphenomaxillary fossa, and one alongside the nose. The malar bone was then replaced as neatly as possible and the cheek stitched to the nose and the lower lid to the cheek. The greatest difficulty was experienced in uniting the torn fragments of the orbicularis palpebrarum and in suturing this to the nasal process. The forehead cut was then attended to, and after dusting the line of sutures with iodoform a compress and dressing of iodoform gauze was so applied as to exert upward pressure and to hold the malar bone in place. The operation occupied upward of two hours and no anæsthetics were employed. But little pain was complained of. A very fair recovery followed. The patient resumed work on January 1. There is some paralysis of the right cheek and the right malar bone is on a somewhat lower level than the left, though bony union is perfect.

The inner canthus of the right eye is drawn down somewhat, as would naturally be expected, from the contracting cicatrix alongside the nose, which cicatrx extends vertically downward. The tear duct performs its functions and the deformity is slight, when the destructive nature of the injury is considered.

NAVAL STATION, CAVITE, P. I.

(*Note.*)

George Pickrell, *Surgeon.*

Denguis.—There was an epidemic of dengue fever on this station during the second quarter of the year. Nearly every man on the station was attacked, 73 being admitted to the sick list. There were no special features about the epidemic, and the fever closely followed the usual type. The first cases were diagnosed originally as febris continua simplex, and in many cases the eruption resembled that of measles so much that they were considered at first to be cases of that disease. The epidemic was serious only in that it attacked and disabled so many men at one time, and convalesence was tedious and prolonged.

HOSPITALS.

NAVAL HOSPITAL, PORTSMOUTH, N. H.

(*Note.*)

Ezra Z. Derr, *Medical Inspector.*

Aneurysma.—A chief machinist, aged 40, was admitted from the U. S. S. *Alliance*, February 3, with the diagnosis of tuberculosis pneumonica chronica. Having had several small hæmorrhages from the lungs, he had been surveyed and recommended for discharge from the service. He was transferred to this hospital pending the action of the Department.

For several winters he had been troubled with cough and hoarseness and had lost weight. After admission to hospital he had complained of some pain in the left chest, in front. His voice was weak and husky and tubercular laryngitis had been suspected. The diagnosis of pulmonary tuberculosis could not be affirmed positively, although it was probable from the loss of weight and the presence of cough. There was an evening rise of temperature of a degree to a degree and a half above normal, and bronchial breathing with slight dullness on percussion at the left apex.

On February 8 he was taken with profuse hæmorrhage from the lungs and died in a few minutes. An autopsy revealed the presence of a large blood clot, almost filling the left pleural cavity, due to the rupture of a small aneurysm situated on the inferior aspect of the arch of the aorta. No evidence of tuberculosis could be discovered. The presence of the aneurysm was not suspected during life.

Osteomyelitis.—A yeoman, second class, aged 24, was admitted from the U. S. S. *Alliance*, on December 15, as with periostitis affecting the lower third of left tibia. He stated that he had had pain in the leg for a month and that he had fallen down the spar-deck ladder on two occasions, each time hurting his left leg and ankle.

On admission he complained of deep-seated pain over the lower third of the left tibia, extending into the ankle. Swelling and redness developed and an incision was made over the tibia and pus evacuated. Later other incisions were made, under ether, over the tibia and fibula, and the bones thoroughly scraped. The disease was found to involve the internal malleolus as well as a considerable portion of the shaft of the tibia. The ankle pain abated, but the suppurative process continued and the ankle became much swollen.

On the 9th of January the patient was anæsthetized. The incisions were enlarged and the bones well exposed. The medullary canal was found to be involved. Some dead bone was removed, including portions of both malleoli. The ankle joint was entered and some pus evacuated. A tube was then introduced to insure drainage and the parts dressed daily. The wounds tended to close, but there was a constant discharge of pus from the bone and from the joint. His general health improved. The local condition remained much the same, with pus discharging from sinuses at the lower portion of the leg.

After careful consideration amputation was decided upon as preferable to excision of the ankle joint. The leg was amputated at the middle third on April 7. The patient stood the operation well, and most of the wound healed by first intention. A small amount of suppuration continued for several days, but the sinus finally closed, with the general health in good condition and the stump free from pain.

NAVAL HOSPITAL, CHELSEA, MASS.

(*Note.*)

JOSEPH G. AYERS, *Medical Director.*

Ulcus.—On May 5, a landsman, age $35\frac{3}{12}$, was admitted to the hospital from the U. S. receiving ship *Wabash*, with ulcer of the face. Two months previous he had noticed a small pimple on the left side of his face below the zygomatic arch. This increased and was injured several times during shaving, an ulcer finally resulting which enlarged to the size it had on date of admission, when there was a hard, undermined, epitheliomatous, ulcerated growth on the left cheek in extent three-quarters by one-half an inch. An examination of scrapings proving negative, a small piece was removed and sections made by the microtome. These showed the characteristic epithelial nests of epithelial cancer, with kite-shaped cells and the connective tissue stroma infiltrated by single and double nucleated cells. No tubercle bacilli could be found in scrapings or sections. There were the ordinary pus organisms on the surface. Specific disease was denied. The patient was prepared for operation, and the tumor deeply and broadly removed by elliptical incisions, cutting out every trace of cancerous tissue. The wound was partly closed by sutures, the center being allowed to granulate. Small strips of frog skin were later transplanted to the granulating area, adhering well, and the wound was healed on June 12, with no trace of epithelioma remaining.

Tuberculosis pneumonica.—A private marine, age 22, was admitted to the hospital on December 6, with tuberculosis of the lungs. He had been under treatment at the navy-yard, Boston, for over two weeks for pulmonary trouble. On admission he had a phthisical cough with characteristic sputa. The latter, on being examined, was found to contain a large number of tubercle bacilli. There was diminished respiratory murmur over the upper left chest, and signs of beginning consolidation.

The patient was emaciated and had night sweats, hectic fever, dyspnœa at times, and cough with muco-purulent sputum. He was put to bed and given a full diet, with creosote in emulsion, 3 drops after meals. In the course of a week the dose of creosote was increased to 5 drops after meals. On January 15 he was feeling much better. Cough had lessened, and he was directed to take setting-up exercise with pulmonary inflation. The creosote was increased to 15 drops three times daily. On February 15 an examination of the sputum showed tubercle bacilli, but they had greatly decreased in number. Exercise and lung gymnastics, bathing, diet of milk, eggs, and steak continued. He improved steadily, and on June 11 was doing duty as orderly, his cough having disappeared. On July 1 he was convalescent, and on examination there was no sign of lung consolidation. He had regained his normal weight, and on July 10 was discharged to duty, apparently recovered and with no symptoms of tubercular or other lung disease remaining. He was seen on October 5, and was well and without cough, had gained 15 pounds, and was working as conductor on an electric road, having obtained his discharge from the service.

Hernia.—Bassini's operation for radical cure was done in two cases with good results. The usual incision was made over the sac, the latter stripped from the cord, amputated, and the stump replaced in the abdomen. The muscles and fasciæ were approximated by strong silk interrupted sutures. A continuous silkworm-gut suture was used to close the skin incision. The wounds were sealed with collodion. There was primary union and firm scars resulted.

NAVAL HOSPITAL, NEWPORT, R. I.

(*Note.*)

Charles A. Siegfried, *Medical Inspector.*

Febris enterica.—Typhoid fever cases had been admitted to the hospital throughout the summer from the ships of the North Atlantic Squadron and from the *Constellation.* There were, however, only 2 cases from the latter ship up to September 15. A few cases in the fleet were traced to New York, and the rest to going on shore at Newport, R. I. In all there were 40 cases of typhoid fever under treatment during the fourth quarter of the year. It must be stated that the majority of the cases were mild, only 6 causing anxiety, and but 4 being followed by regular and severe relapses. The only fatal cases, those from the *Constellation*, had been living while off duty in the most insanitary section of the city of Newport. From this section J. T., master-at-arms, was admitted to hospital on August 27, and died three days later with perforations of the intestines and peritonitis. It was found that he had been ill for three weeks, with loss of appetite, nosebleed, diarrhœa, and weakness. During all this time he continued at his duties and mingled with his associates ashore and at the training station. The other case from the *Constellation* was also a virulent one, and death occurred, within eight days of admission, from toxæmia. He had been ill for probably a fortnight before reporting to the medical officer of the station.

The *Lancaster*, on August 17, transferred to this hospital another case of typhoid fever. Other cases were received, from the *Indiana*, *Texas*, and *Massachusetts*, during July and August, including 1 officer.

Within four weeks of J. T.'s death, the first cases from among the apprentices were admitted to hospital, and from September 24 to October 1 the cases numbered 12, well defined, with 6 suspects. During October the number of cases increased rapidly, and there were admitted to hospital for the month 30 undoubted cases of typhoid fever, including 1 officer, who had quarters in the town. In the same block with this officer's quarters there were 2 other cases of typhoid fever. The whole number of cases for the year treated at this hospital, including those from cruising ships and all sources, was 49. The epidemic declined during November, 1 case being admitted in that month and 2 in December.

The city water supply had been considered a menace to those using it. It was more than usually suspected this fall, because the dry summer weeks were followed by a few sudden heavy rainfalls, undoubtedly washing additional impurity from the small farms and pasture land into the ponds. Typhoid fever was present in the adjoining town and its vicinity, and from September 15 it was estimated that there were 45 cases under treatment there. The intercommunication between the whole body of people at the training station and the town is constant and close.

The diagnosis of typhoid fever was based upon the character and extent of the febrile movement and upon the prostration, skin eruption, nosebleed, head pains, coated tongue, abdominal signs, splenic enlargement, bowel discharges, diazo reaction, and the Widal reaction of the blood. There were only 2 deaths. A few cases persisted beyond the usual period of elevated temperature. Temperatures were admirably controlled by means of the cold bath, each ward being supplied with a portable tub. About 20 per cent of the cases required cold tubbing every few hours, and some few oftener. One case had persistent high temperature (105° F.) for several days, and required hourly baths to keep it within bounds.

The routine treatment consisted in the use of calomel and quinine quite freely during the first forty-eight hours, then the systematic administration of duotal, naphthol, thymol, of each 0.15 grams, and strychnia (one-fiftieth grain) every three hours. Ice bags were applied to the head, the hair being cut short. Cold tubbing was given as required to keep the temperature below 102° F. Turpentine stupes were applied to the abdomen whenever tympany was noted; brandy and strychnia given in weakened heart action, and urotropin in late stages, when conditions of the urinary tract seemed to demand it. The diet was milk and lime water, equal parts, supplemented with milk punch, eggnog, and meat juice. After ten days with a clean tongue and without fever, starchy milk puddings, eggs, and broths were added to the diet. The bowels, if they did not move of themselves, were daily solicited by enemata. The hemorrhagic cases were 6 in number, only 1 profuse. Bronchial irritation was noted in most of the cases. There were 6 cases with pronounced symptoms of lethargy. Dry mouths, fissured lips, and delirium were nearly always absent. Nausea was troublesome in a few cases, and 1 case of prolonged high temperature digested milk with difficulty. Convalescence, with a few exceptions, was rapid; in fact there were not any cases with very marked emaciation. The average stay in hospital for each case was about forty days.

NAVAL HOSPITAL, BROOKLYN, N. Y.

(*Note.*)

GEORGE W. WOODS, *Medical Director.*

Echinococcus.—A water tender, age 47, was admitted to the hospital on January 20. On examination his left scapula was found to be fractured, and there were signs of a traumatic pleuritis on the left side. He had been on a debauch, and his injuries were the result of a fall on board ship. He complained of pain in the upper abdomen, and later developed a severe cough, with profuse purulent expectoration, an evening rise of temperature, and the signs of empyema of the left pleural cavity. The patient stated that the cough first appeared soon after his return from Cuba. The right chest was enlarged and immobile, with vocal fremitus and resonance absent over the lower portion. There was some tenderness over the liver, with displacement downward and some effusion into the general peritoneal cavity. Percussion over the upper part of the chest anteriorly, posteriorly, and laterally gave impaired resonance, while over the lower part of the chest there was a "cracked-pot" or metallic sound. Respiratory sounds were roughened with expiration prolonged over the upper part of the right chest and absent over the lower part. The patient was losing weight, and there was a profuse thick, purulent expectoration. Aspiration of the left thorax revealed pus. On February 11, under chloroform, a portion of the sixth rib was resected and about one liter of pus removed from the right pleural cavity. Double drainage tubes were introduced. The following day the chest was washed out with sterile salt solution. There was considerable discharge and mingled with it were flakes of fibrin. The pleural cavity was repeatedly irrigated with warm salt solution and applications of compound iodine solution made. A fibrinous membrane continued to come away in fragments, and on February 20 there were extracted pieces 4 to 6 inches to even 12 inches square and almost one-eighth of an inch in thickness.

On February 24, while washing out the cavity, first a large and then several small round globular bodies were forced out of the wound. These bodies were filled with fluid, covered with a membranous envelope, and varied from the size of a Concord grape to that of an egg. On microscopic examination these proved to be hydatid cysts possessing scolices and hooklets. The diagnosis was changed to echinococcus. Cysts and shreds of membrane continued to come away from the wound. They gradually decreased in number, and while there was considerable discharge from the wound, on March 10 the cysts had ceased to appear. A sinus persisted, several inches deep and running downward and backward, and there were signs of a cavity extending to near the lower edge of the ribs in the mid-axillary line.

On March 22 the patient complained of pain in the left shoulder joint and some swelling was noticed. This pain increased in violence and the shoulder remained enlarged. There was no increase of temperature and no other joint was affected, but he was given 15 grains of sodium salicylate every four hours. This medication seemed to have no effect and was discontinued on the 31st. As the abcess cavity was not diminishing in size, and some discharge continued, on April 9, 2 inches of the ninth rib in the posterior axillary line were resected and the incision continued into the peritoneal cavity. Adhesions were found between the surface of the liver and the abdominal wall except at the anterior angle of the wound. At the latter place the two layers of peritoneum were stitched together, and the opening into the liver postponed, after packing the wound, to allow adhesions forming thoroughly between the liver and the abdominal wall. A day or two later the incision was enlarged and the cavity in the liver fully exposed. It was found to be small and contained no pus or cysts. A very small canal led from wound No. 1 to bottom of cavity. It was well irrigated with sterile salt solution, and a drainage tube introduced. There was still some elevation of temperature and a renewed complaint of pain in left shoulder. The skin over the greater tuberosity of the left humerus was shiny and reddened, and the tuberosity seemed to be enlarged. The trouble in the chest improved steadily, but the shoulder remained enlarged and painful, and on the 29th of May an incision was made down to the bone. The bone was softened and at the junction of head and neck there was a cavity which appeared to communicate with the medullary canal in the shaft of the humerus. The cavity was thoroughly curetted and washed with hot sterile salt solution and packed with iodoform gauze. There was no pus present. Some of the scrapings looked fleshy and they were saved for a microscopic examination, but the diagnosis of hydatids could not be confirmed. The patient's condition improved steadily, both wounds closing, and he was discharged to duty on September 8.

Appendicitis.—A landsman, age 19, was admitted December 23 with suppurative appendicitis. The patient had had pain in the right iliac region, with high fever and vomiting, for nine days. On admission the abdominal muscles on the right side were tense. At the outer border of the right rectus muscle, on the line from the umbilicus to the right anterior superior spine of the ilium, a tumor was made out, and this was the point of greatest tenderness. His expression was anxious, mouth foul, and he seemed thoroughly septic. He had vomited several times the preceding evening, the vomitus being fluid and dark colored. His temperature was 103° F., pulse 96. Under ether-chloroform anæsthesia and with all aseptic precautions the abdomen was opened over the tumor, which was about the size of an orange, and in direct relation to the cæcum. The tumor was carefully walled off with pads and strips of gauze. It appeared to contain pus, which a needle later demonstrated. There were adhesions binding down the cæcum. A small opening was made into the tumor and the pus let out a few drops at a time, these being promptly wiped away. When the pocket was nearly empty, the opening was carefully enlarged. This was followed by rather profuse bleeding. A shred of gangrenous tissue came away, thought to be the remains of the appendix. The pocket was wiped out and packed. The parts of the peritoneum soiled during the operation were carefully cleansed with salt-solution wipes. Gauze drains were introduced, and the incision was closed in part with silver wire. An ample gauze-cotton dressing and binder were applied. He stood the operation well. In the evening of the same day his temperature was 104° F.; vomiting; condition unfavorable. He passed a comparatively comfortable night, sleeping from time to time, and he seemed generally improved. The next day he seemed decidedly improved, had no pain, and the vomiting had ceased. At 7 p. m. he was restless and the thermometer recorded a temperature of 105.2° F. There was a tender swelling in the right parotid region, thought to be a beginning suppurative parotitis from mouth infection. The patient had a restless night, necessitating small doses of morphia to produce quiet. Temperature, 102° F.; pulse, 120. There was no abdominal tenderness; no tympanitis. He appeared to be suffering from septicæmia. After a restless night he appeared decidedly septic the next day, although there were no signs of peritonitis. It was decided to remove the pus from the right parotid gland, which was done by dissection under chloroform anæsthesia. He stood the operation and dressing badly, active stimulation being required. During the afternoon his temperature rose to 106° F. and his pulse became weak and rapid. He was stimulated with whisky and strychnia and small doses of morphia were given for restlessness and indefinite abdominal pain. He was perspiring and seemed to be failing rapidly. He succumbed gradually and died at 9.50 p. m. on December 27. Autopsy:

The abdomen was examined. There was no evidence of general peritonitis. The pus pocket had been perfectly drained, being in close contact with the cæcum, which formed its outer wall. The cæcum was opened, and the opening into the appendix was found. It led into the abscess cavity, three-quarters of an inch of the appendix remaining. The distal portion had sloughed off and was probably removed at the time of operation. There were no adhesions formed walling off the field of operation. In the pelvis there was pus beneath a coil of intestines with recent lymph on adjacent parts. It was considered that the patient died of septicæmia, induced by gangrenous appendicitis, which a laparotomy failed to relieve.

Of the 7 remaining cases of appendicitis under treatment during the year, 2 recovered without operation, 2 were continued into the year 1900, and 3 were operated upon with relief of symptoms and recovery in 2 cases, death resulting in 1 case from septic peritonitis, which was found at the time of operation.

X-ray apparatus.—This apparatus has been used in all fractures and dislocations and in other suitable cases, and has given great satisfaction. An uncommon use of this instrument was made in a case of suspected tuberculous deposit in the right lung. A normal boy about the patient's size was examined for comparison. The patient was then examined, and the deposit plainly made out and its presence verified by the stethoscope. In another case a cavity could be plainly seen. The apparatus is in good order, and no burns have followed its use.

NAVAL HOSPITAL, WASHINGTON, D. C.

(*Note.*)

ABEL F. PRICE, *Medical Director.*

Hernia.—A yeoman, second class, age 27, was admitted to the hospital on January 17 as with incomplete double inguinal hernia. On January 23 he was carefully prepared for operation by Bassini's method. Both herniæ were operated upon. There were no noteworthy features, and the patient was discharged, cured, on March 4.

Appendicitis.—An apprentice, age 17, was admitted on June 10 with appendicitis. There was a history of dietary indiscretion followed by general abdominal pain, which became localized at a little below McBurney's point. The bowels had been thoroughly opened on the previous day. The patient complained, in addition, of feeling feverish. His temperature was 100° F., pulse 80. On physical examination there was a slight resistance of the muscles in the right iliac region and dullness on percussion. Palpation in this region was painful. He was put to bed and an ice bag applied over the appendix. At 10 p. m. acute pain in the right iliac fossa following a sudden movement was complained of, which increased in intensity and was accompanied by pinched features, increased abdominal rigidity, accelerated and weakened pulse, and difficult breathing. Morphia was required for the pain and moderate stimulation for his collapsed condition. Hot flaxseed poultices were applied to the abdomen, and by the following morning the patient was greatly improved. Temperature, 101.4° F.; pulse, 88. Dullness in the right iliac fossa over an area 5 inches in diameter and rigidity were marked. In the evening his temperature was 104° F., pulse 100. On June 12 the patient was more comfortable, but the mass in the right iliac fossa was somewhat increased in size and was very tender. The bowels were kept free by enemata. By June 17 the mass in the region of the appendix was still increasing and exquisitely tender and there was considerable pain. As there seemed to be no prospect of improvement without operative measures, he was prepared for operation. A large abscess cavity was opened, drained, and irrigated with sterile water. It was apparently well walled off. The appendix was not found, and a search for it would have been fraught with danger in breaking up the protective adhesions walling off the abscess from the general peritoneal cavity. After a thorough flushing an iodoform gauze drain was inserted to the bottom of the abscess cavity, which appeared to be inferior to and in a plane posterior to the cæcum. The wound was then closed by deep silkworm-gut sutures, those about the gauze drain being left untied. The operation lasted only twelve minutes. The abscess cavity gradually closed, leaving a small sinus, which granulated and healed, leaving a firm cicatrix about 3 inches long. The case was somewhat prolonged on account of his general debilitated condition, and he was discharged to duty on October 11.

Fractura.—An ordinary seaman, age 26, was admitted to the hospital on June 29 as with fractura. The injury had been received from the bursting of a rapidly revolving crank wheel, the patient's leg having been struck by the flying fragments. He sustained a compound comminuted fracture of both bones of the leg just below the junction of the lower and middle thirds, together with disorganization of the soft parts. There were also many small fragments of bone in the soft tissues and a fissure in the tibia extending toward the ankle joint. At the middle third of the left thigh there was a large contusion with multiple abrasions, and the parts were so swollen that the condition simulated a fracture. This latter injury extended into the knee joint, indicated by pain and swelling from effusion. The patient was in a state of mild shock from the accident, but his pulse was fairly good and there had been very little loss of blood. The injured limb was not manipulated, but ether was immediately given for examination and operation. It was decided to amputate the leg at a point above the lower third, leaving the thigh intact. The usual amputation was performed by circular method modified by an incision on the external surface. The skin incision was at a point just below the junction of the lower and middle thirds of the leg. The flap was dissected up with the periosteum and muscular layers. There was very little bleeding after removal of the elastic tourniquet. A few small arterial branches required ligation, and then hot antiseptic solution was applied to the stump. The flaps were approximated with silk sutures, a small gauze drain being inserted at the outer angle of the wound. The stump was dressed with sterile gauze and a roller bandage applied firmly as far as the groin, with the idea of controlling excessive muscular action. There was considerable shock incident to the operation, and one-fiftieth of a grain of strychnia was given and repeated. He improved steadily, however, and beyond a slight rise of temperature on the day following the operation and some irritation of the stump which followed undue exertion and use on the part of the patient there was nothing noteworthy during convalescence. The patient was discharged with a well-fitting artificial limb.

Febris enterica.—A private marine, age 22, was admitted on July 19 as with febris enterica. The fever ran an ordinary course, and the temperature was normal and the patient convalescent at the end of the third week. The temperature remained normal for eight days, when a relapse occurred, apparently due to dietary indiscretion. The relapse lasted twenty-one days and was more severe than the primary attack, the temperature remaining at about 104° F. Alcohol baths with fanning were used, alternating with cold-water spongings. The bowels were constipated and the patient required enemata during the entire illness. The Widal reaction was intensified during the relapse, and it persisted for one month after the temperature reached the normal point. At the beginning of his relapse the patient had a decided chill, and malarial plasmodia were found in the blood, but disappeared under the administration of quinia. During the relapse the heart became dilated, its action weak, and a loud systolic murmur was present. The patient was in a low condition and required constant care and stimulation, champagne being given every two hours, and strychnia one-thirtieth grain three times daily, with an occasional dose of tincture of digitalis as required. Milk was well tolerated throughout the attack. The patient was discharged to duty well on October 9.

NAVAL HOSPITAL, NORFOLK, VA.

(*Note.*)

NELSON M. FEREBEE, *Medical Inspector.*

Urethræ strictura.—P. J., age 40, was admitted to the hospital on April 15. There was a history of repeated attacks of malarial fever extending over a period of years, of urethral stricture, and of cystitis. He had been accustomed to pass sounds periodically, but for about six months had neglected to do this. On the day of his admission he had several chills, apparently similar to those from which he had previously suffered, but followed by more free perspiration. About the 12th of April he had noticed an increase in the quantity of a gleety discharge which had existed for a long time. On April 15 there was increased difficulty in urination and the patient noticed a swelling of the perineum. A severe chill followed. He was put to bed and a soft catheter passed, giving exit, from the region of the perineal swelling, to pus of a highly fetid character. On the next day he had high fever and there was œdema over the symphysis pubis. Perineal urethrotomy was performed under ether. The tissues about the urethra were thickened and almost cartilaginous in places. Apparently several false passages existed and the tissues were extensively disorganized and sloughing. Stricture bands were divided as freely as possible and a catheter passed with much difficulty into the bladder. The latter was then irrigated with hot boric-acid solution, the wound with sublimate solution, and two catheters left in place passing from the perineal wound to the bladder and to the meatus, respectively. Drains of sublimate gauze were passed through the sloughing tissues anteriorly and posteriorly. The patient's distress was temporarily relieved by the operation, but acute septic cellulitis rapidly extended over the abdomen from the œdematous region over the symphysis.

On April 21 free incisions were made into the cellular tissue of the abdomen at five points, reaching in each case sloughing and highly offensive cellular tissue and abundant pus. Between the incisions the dead cellular tissue was freely broken up by the finger, and after irrigation, drainage tubes passed in all directions.

On April 24 extension of pus to the lower right dorsal region required another incision, which was made under cocaine anæsthesia. At this time the separation of the skin from the deep tissues was complete over nearly the entire abdomen. The discharge of pus and sloughs was very free and highly offensive, notwithstanding free irrigation twice daily. Softening and roughening of the vesical end of the catheter required frequent removal, and later a silver female catheter was substituted. At this time the fever was intense, and at times the patient was delirious. With the removal of the sloughs he began slowly to react and improvement continued. On July 1, however, the perineal orifice was still open, its closure having been prevented by passage of sounds, and sounds were also passed to bladder regularly. He still had a slight temperature rise nearly every evening and an occasional rise at irregular intervals to 103°–103.5° F., unaffected by quinine. The cystic condition was satisfactory, and the abdominal wounds had closed with no accumulation of pus.

Febris enterica.—A hospital apprentice, aged $21\frac{1}{12}$ years, on duty at this hospital, was infected while nursing a patient suffering from enteric fever. The onset of the disease was characterized by a severe chill, followed by a rapid rise of temperature to 103.5° F., and an equally sudden drop to nearly normal, which was repeated on the third and again on the fifth day.

On the seventh day several suspicious but not typical rose spots appeared on the abdomen. No abdominal symptoms of any consequence had developed. A mild diarrhea with anorexia and a feeling of weakness was all the patient complained of.

On the ninth day a very satisfactory Widal test cleared up the diagnosis. The patient made favorable progress until the eighteenth day, when his temperature fell to normal and remained so for three days. There was every indication of a speedy recovery, but on the morning of the fourth day of normal temperature he was taken with another chill, which was followed by fever and a return of all the symptoms in an exaggerated degree, the patient soon becoming delirious and rapidly passing into a markedly typhoidal condition.

The stomach would not retain nourishment of any kind; tongue dry, brown, and cracked; no sleep, subsultus tendinum, etc. At this stage of the disease he was given "chlorine water" in dram doses every four hours, and after a few days it was apparent that there was a change for the better. The progress of the case was favorable from that time until the fifty-first day of the disease, when the temperature became normal.

The disease had apparently run its course, and as there were no complications, the patient soon began to gain flesh and strength. However, owing to the fact that he had suffered one relapse, the greatest care was used to prevent his taking anything in the way of food that might be harmful, and no solid food was allowed him until the temperature had been normal for fourteen days.

Ten days later, or the twenty-fourth day of normal temperature, the patient complained of rigors during the night, followed by fever; temperature rising to 103.4° F., some pain in the abdomen, furred tongue, headache, etc. After five days of rest and a liquid diet the temperature again dropped to normal, and the patient made a rapid recovery.

During the entire course of the disease the fever was controlled almost entirely by cold sponging with alcohol and water. Several attempts were made to give him cold baths, but the reduction in temperature was so slight after fifteen minutes in the bath at 78° F. and the after effects so unsatisfactory that the treatment was abandoned entirely.

The marked chill with the sudden rise and fall of temperature which characterized the onset of the disease was more indicative of malaria than typhoid, and in the absence of other symptoms of the latter affection, the patient was given quinia freely for a few days.

The case was under treatment from the onset until discharged to duty, one hundred and three days, and during that time there were two relapses, one on the 21st day and a second on the 75th day of the disease.

Febris pneumonica.—A landsman, aged 23, was admitted February 18, with febris pneumonica which had followed symptoms indicative of an attack of catarrhus epidemicus, which disease was then prevalent. On admission his temperature was 104° F., pulse 130, respiration 32. Physical examination confirmed the diagnosis and the usual symptoms were present.

On February 23 the temperature fell and he apparently improved for a few days. This was followed by a temperature rise and an increase of cough with tenacious expectoration and great distress. No chills were noted but there was occasional profuse perspiration.

On March 11 the temperature fell to normal with the patient very weak and condition serious. Four days later 10 fluidounces of purulent fluid were removed from the left pleural cavity but no expansion of the lung could be observed, it being apparently consolidated.

On March 24, fluid having accumulated in left pleural cavity to such an extent as to displace the heart and interfere with the action of the right lung, 36 fluidounces of pus were removed, the last portion being blood-stained. At the end of a week, aspiration was repeated after consultation as to his ability to stand a more formidable operation, and 48 fluidounces of pus removed, together with some gas or air. Some relief to respiration followed the aspiration, but no improvement in his general condition. It was decided on consultation that a free opening into the pleural cavity offered the only hope of relief, and under cocaine anæsthesia an incision 1½ inches long was made through the seventh interspace. Three to 4 pints of pus were evacuated when the flow became blood-stained from oozing from the surfaces, following relief from pressure, and the flow was stopped and pressure applied.

An apparent rally was followed by a violent attack of coughing with expectoration of pus and blood, and followed by acute dyspnœa. Circulation and respiration steadily became worse, and death took place about four hours after the operation.

The necropsy showed sinuses of beginning spontaneous perforation through chest wall, the pleura being degenerated and ulcerated. The left pleural cavity contained about four pints of serum, pus, and coagula. The left lung was collapsed and degenerated, and its apex strongly adherent to the chest wall. The right lung was somewhat compressed, but otherwise normal. The heart was displaced four-fifths to the right of the median line.

NAVAL HOSPITAL, MARE ISLAND, CAL.

(*Note.*)

GEORGE P. BRADLEY, *Medical Director.*

Otitis media.—A musician, second class, age 36, was admitted to hospital May 24 with otitis media, involving the mastoid cells. About one week previous the patient had suffered exposure and later complained of earache. When first seen on the 24th of May he had had a chill the evening before, and complained of tenderness over the mastoid. There was a free mucopurulent discharge and his temperature was 102° F. On the 25th an examination revealed a perforated right membrana tympani. The patient complained of headache and there was still tenderness over the mastoid. He showed no improvement, and on the 26th had an epileptiform convulsion. On the 29th there was distinct bogginess over the mastoid and preparation for operation was made. An incision 2 inches in length was made behind the ear down to the bone, including the periosteum, and a button of bone 2 mm. in diameter removed. Granulation tissues and a few drops of pus followed and the cavity of the mastoid cells was irrigated with sublimate solution 1–4,000, packed and drained. The discharge from the ear continued for some days, but other symptoms were completely relieved, and beyond deafness in the affected ear, the patient was discharged to duty well on July 13.

STATISTICAL TABLES.

The following statistical tables give in detail the data on which the statements of this report are based:

I. General view of the effects of disease and injury on the Navy and Marine Corps during the year 1899.

II. *North Atlantic Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospitals, discharges from the service, and deaths on each ship for the year 1899.

III. *South Atlantic Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospitals, discharges from the service, and deaths on each ship for the year 1899.

IV. *Pacific Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospitals, discharges from the service, and deaths on each ship for the year 1899.

V. *Asiatic Station.*—Names of ships, average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospitals, discharges from the service, and deaths on each ship for the year 1899.

VI. *Receiving ships.*—Names of ships, average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospitals, discharges from the service, and deaths on each ship for the year 1899.

VII. *Navy-yards, marine barracks, and other shore stations.*—Names, average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospitals, discharges from the service, and deaths during the year 1899.

VIII. *Force afloat.*—General aggregate, 1899.

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XII. *Naval hospitals.*—General aggregate, 1899.

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XIV. *Prevalence of special diseases (relation by scale).*—1899.

XV. *Mortuary record.*—1899.

XVI. *Deaths in the Navy and Marine Corps during the year 1899 (relation by scale).*

TABLE I.—*General view of the effects of disease and injury on the Navy and Marine Corps during the year 1899.*

Average strength of the Navy and Marine Corps	[1]20,819
Average strength shown by reports of Medical Department	[2]20,113
Admissions for disease, ashore and afloat	12,794
Ratio per 1,000 of strength	636.11
Ratio per 1,000 for previous year	695.42
Ratio per 1,000 for four preceding years	653.05
Admissions for injury, ashore and afloat	2,955
Ratio per 1,000 of strength	146.92
Ratio per 1,000 for previous year	176.27
Ratio per 1,000 for four preceding years	163.11
Total admissions to sick list during the year	15,749
Ratio per 1,000 of strength	783.03
Ratio per 1,000 for previous year	871.69
Ratio per 1,000 for four preceding years	816.15
Daily average of patients	645.82
Ratio per 1,000 of strength	32.11
Ratio per 1,000 for previous year	29.46
Ratio per 1,000 for four preceding years	30.54
Total number of sick days	235,725
Average for each man of Navy and Marine Corps	11.22
Average for previous year	10.75
Average for four preceding years	11.15
Average days each case was treated	14.97
Average for previous year	12.33
Average for four preceding years	13.48
Discharges from service for disease	452
Ratio per 1,000 of strength	21.71
Ratio for previous year	30.06
Ratio for four preceding years	20.65
Discharges from service for injury	92
Ratio per 1,000 of strength	4.42
Ratio per 1,000 for previous year	6.80
Ratio per 1,000 for four preceding years	4.11
Total discharges for disability	542
Ratio per 1,000 of strength	26.03
Ratio per 1,000 for previous year	36.85
Ratio per 1,000 for four preceding years	24.77
Deaths from disease	95
Ratio per 1,000 of strength	4.56
Ratio per 1,000 for previous year	4.92
Ratio per 1,000 for four preceding years	4.58
Deaths from injury (including poison)	58
Ratio per 1,000 of strength	2.79
Ratio per 1,000 for previous year	2.29
Ratio per 1,000 for four preceding years	1.80
Total deaths from all causes	153
Ratio per 1,000 of strength	7.35
Ratio per 1,000 for previous year	7.21
Ratio per 1,000 for four preceding years	6.39

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[1] Used in computing ratios of deaths and discharges from service for disability.

[2] Used in computing all ratios except those of deaths and discharges from service for disability.

TABLE II.—*North Atlantic Station.—Average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship, for the year 1899.*

Name of ship.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Alliance	Year	221	148	69	217	981.04	1,438	3.94	17.83	34	2	----
Amphitrite	Year	153	73	28	101	660.13	606	1.66	10.85	22	----	1
Annapolis [1]	247 days	97	28	6	34	350.52	450	1.82	12.64	5	----	1
Arethusa [1]	31 days	7	5	2	7	1,000.00	48	1.55	18.90	1	----	----
Bache [2]	275 days	30	31	3	34	1,133.33	172	.63	15.75	11	1	----
Blake [1]	181 days	21	28	2	30	1,428.57	305	1.69	40.23	1	----	----
Brooklyn	Year	521	384	66	450	863.72	4,011	10.98	21.07	32	1	----
Buffalo [3]	181 days	291	134	24	158	542.95	3,196	17.65	30.07	34	----	2
Cæsar [2]	184 days	20	14	2	16	800.00	17	.09	2.25	13	----	----
Chesapeake [2]	20 days	8	----	2	2	250.00	----	----	----	2	----	----
Chicago	Year	394	199	50	249	631.98	1,192	3.27	8.30	60	----	1
Cincinnati [1]	48 days	36	31	7	38	1,055.55	436	9.08	33.13	9	----	----
Columbia [1]	90 days	19	19	3	22	1,158.95	50	.56	7.27	10	1	----
Detroit	Year	221	64	18	82	371.04	934	2.56	11.58	10	----	----
Dixie [3]	113 days	50	6	----	6	120.00	20	.18	1.12	3	----	----
Dolphin	Year	117	77	17	94	803.42	663	1.80	15.38	16	----	1
Eagle	Year	47	24	15	39	829.90	271	.74	15.74	6	----	----
Essex	Year	235	112	18	130	553.33	1,139	3.09	13.15	5	----	----
Fish Hawk	Year	46	21	5	26	565.22	157	.43	9.35	4	----	----
Hist [1]	31 days	3	5	2	7	2,333.33	31	1.00	28.57	----	----	----
Indiana	Year	439	179	60	239	544.42	1,071	2.93	6.67	55	----	2
Lancaster	Year	295	151	37	188	637.29	1,602	4.39	14.88	25	----	2
Lebanon [1]	105 days	17	7	----	7	411.77	70	.67	11.36	5	----	----
Machias	Year	139	93	21	114	820.14	854	2.34	16.83	17	----	----
Marcellus [1]	65 days	13	5	1	6	461.54	54	.83	11.37	2	----	----
Marietta	Year	133	79	14	93	699.25	687	1.88	14.14	14	2	----
Massachusetts	Year	433	210	76	286	683.60	1,659	4.55	10.51	48	----	1
Mayflower [1]	32 days	17	3	7	10	588.24	95	2.97	15.31	2	----	----
Miantonomoh [1]	67 days	7	4	----	4	571.43	10	1.49	39.21	4	----	----
Michigan	Year	104	41	18	59	567.31	449	1.23	11.83	1	2	----
Minneapolis [1]	81 days	22	13	4	17	772.73	104	1.28	12.93	6	----	----
Monongahela [2]	245 days	139	91	19	110	791.37	592	2.42	11.69	12	----	----
Nashville	Year	164	113	22	135	823.17	1,028	2.82	17.20	12	----	----
New Orleans	Year	301	191	48	239	794.02	921	2.52	8.37	49	3	1
New York	Year	526	301	84	385	731.94	3,576	9.80	18.62	45	1	----
Panther [1]	293 days	124	79	19	98	790.32	932	3.18	20.65	20	----	----
Peoria [1]	163 days	20	20	1	21	1,050.00	168	1.03	22.89	3	3	----
Pompey [1]	28 days	3	7	----	7	2,333.33	2	.07	17.95	6	----	----
Prairie [2]	349 days	134	44	28	72	537.31	545	1.53	10.93	24	----	2
Potomac [3]	135 days	11	14	1	15	1,363.64	89	.66	22.00	9	----	----
Puritan [1]	61 days	9	8	1	9	1,000.00	50	.82	15.18	1	----	----
Raleigh [1]	161 days	121	44	12	56	462.81	650	4.04	14.74	12	----	----
Resolute [1]	349 days	130	83	17	100	769.23	633	1.81	13.31	13	3	----
Scorpion [2]	132 days	41	10	4	14	341.46	56	.42	3.77	5	----	----
Southery [1]	32 days	6	15	4	19	3,166.67	68	2.13	31.32	3	----	----
Sterling [1]	60 days	10	7	6	13	1,300.00	182	3.03	49.67	8	----	----
Supply [1]	118 days	36	8	3	11	305.56	260	2.20	19.82	20	----	1
Terror [1]	56 days	6	2	----	2	333.33	8	.14	3.59	1	----	----
Texas	Year	399	197	82	279	699.26	2,049	5.61	14.06	27	----	----
Topeka [1]	59 days	29	17	2	19	655.17	136	2.30	12.85	6	----	----
Vicksburg [1]	144 days	61	29	5	34	557.38	266	1.85	11.93	6	----	----
Viking [2]	18 days	2	----	1	1	500.00	8	.45	10.98	----	----	----
Vixen	Year	72	54	5	59	819.44	327	.90	12.58	14	----	----
Vulcan [1]	8 days	3	6	----	6	2,000.00	2	.25	18.25	7	----	----
Yankee [1]	75 days	8	1	----	1	125.00	1	.02	.51	1	----	----
Yankton	Year	77	58	13	71	922.08	490	1.34	17.40	4	----	1

[1] Put out of commission. [2] Commissioned. [3] Commissioned and put out of commission.

TABLE III.—*South Atlantic Station.—Average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship, for the year 1899.*

Name of ship.	Periods in commission.	Average complements.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Montgomery	Year	224	274	53	327	1,458.21	2,134	5.85	26.12	26	----	1
Wilmington	Year	199	116	10	126	633.41	1,491	4.08	20.50	5	----	----

TABLE IV.—*Pacific Station.—Average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship, for the year 1899.*

Name of ship.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Abarenda	Year	91	39	11	50	549.45	559	1.53	16.81	8	1	----
Adams	Year	222	123	28	151	680.18	1,090	2.99	13.47	15	1	----
Albatross	Year	57	9	2	11	192.98	102	.28	4.91	----	----	----
Badger[1]	304 days	129	72	44	116	899.22	848	2.72	17.66	22	1	----
Gedney	Year	31	19	5	24	774.19	55	.15	4.84	----	----	----
Hartford[2]	91 days	110	77	25	102	727.27	686	7.54	17.10	6	----	----
Iowa	Year	532	149	62	211	396.62	2,248	6.16	11.58	26	----	----
Iroquois	Year	38	12	----	12	315.79	118	.32	8.42	2	----	----
Marblehead	Year	245	169	55	224	914.29	1,427	3.91	15.92	24	----	----
McArthur	Year	26	13	3	16	615.38	76	.21	8.08	----	----	----
Newark	Year	295	291	78	369	1,250.84	2,982	8.17	30.75	34	1	----
Pathfinder[2]	266 days	48	22	7	29	604.17	286	1.08	16.36	2	----	----
Patterson[2]	250 days	33	49	8	57	1,727.27	371	1.48	30.83	1	----	----
Pensacola	Year	201	108	30	138	686.57	1,137	3.12	15.52	13	1	----
Philadelphia	Year	341	132	56	188	551.32	1,770	4.85	14.22	15	1	7
Ranger[2]	61 days	20	5	2	7	350.00	40	.66	5.50	1	----	----
Scindia[1]	147 days	44	25	14	39	886.36	768	5.22	47.89	7	3	----

[1] Put out of commission.

[2] Commissioned.

TABLE V.—*Asiatic station.—Average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship, for the year 1899.*

Name of ship.	Periods in commission.	Average complements.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Baltimore	Year	432	283	86	369	854.17	3,473	9.52	22.04	34	1	1
Bennington	Year	179	107	29	136	759.78	1,338	3.67	20.50	22	....	1
Boston[1]	256 days.	185	112	34	146	789.18	1,862	7.27	30.29	19	....	....
Brutus	Year	55	26	7	33	600.00	334	.92	16.73	2	....	1
Castine	Year	137	126	26	152	1,109.49	1,486	4.07	29.71	6	....	....
Celtic	Year	113	34	13	47	415.93	586	1.61	14.25	5	....	1
Charleston[1]	222 days.	184	151	38	189	1,027.17	1,703	7.67	25.31	16	....	2
Concord	Year	187	107	26	133	711.23	1,126	3.08	16.47	7	....	3
Culgoa	Year	64	84	17	101	1,578.13	636	1.74	27.19	7	....	....
Glacier[2]	340 days.	107	115	35	150	1,401.87	876	2.57	22.54	6	1	1
Helena	Year	186	143	42	185	994.62	1,937	5.31	28.55	12	....	2
Iris	Year	93	39	16	55	591.39	663	1.82	19.78	14	....	1
Manila[2]	275 days.	55	26	15	41	745.45	416	1.51	20.68	4	....	....
Monadnock	Year	189	198	46	244	1,291.01	2,040	5.59	29.58	41	1	2
Monocacy	Year	137	110	26	136	992.70	1,287	3.53	25.77	4	1	2
Monterey	Year	216	110	25	125	578.70	975	2.67	12.36	20	....	1
Nero[3]	294 days.	51	14	4	18	352.94	132	.45	.71	6	....	....
Olympia[1]	311 days.	434	225	22	247	569.12	2,439	7.84	15.37	25	....	2
Oregon	Year	491	294	87	381	775.97	3,895	10.67	21.73	26	3	....
Petrel	Year	131	79	13	92	702.29	632	1.73	13.21	3	1	....
Princeton	Year	131	109	29	138	1,053.44	981	2.69	20.53	20	....	....
Solace	Year	327	215	74	289	883.79	4,454	12.20	37.31	95	....	1
Wheeling	Year	135	83	22	105	777.78	866	2.37	17.56	11	....	....
Yorktown	Year	187	160	50	210	1,122.99	2,257	6.18	33.05	23	....	4
Yosemite	Year	246	382	93	475	1,930.89	4,434	12.50	50.81	42	1	1

[1] Put out of commission. [2] Commissioned. [3] Commissioned and put out of commission.

TABLE VI.—*Receiving ships.—Average complements, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths on each ship, for the year 1899.*

Name of ship.	Periods in commission.	Average complements.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Franklin	Year	329	100	10	110	334.34	506	1.36	4.13	47	....	1
Independence	Year	472	144	55	199	441.61	2,065	5.66	11.99	24	12	1
Richmond	Year	208	73	13	86	413.41	526	1.41	6.78	23	2	2
Vermont	Year	592	243	48	291	491.56	1,244	3.41	5.76	75	....	1
Wabash	Year	255	163	33	196	768.62	785	2.15	8.43	73	....	1

TABLE VII.—*Navy-yards, marine barracks, and other shore stations.—Average complements corrected for time, admissions for disease and injury, sick days, daily average of patients, transfers to hospital, discharges from the service, and deaths for the year 1899.*

Name.	Periods in commission.	Average complements corrected for time.	Admissions.			Admission rate per 1,000 of strength.	Number of sick days.	Daily average of patients.	Ratio per 1,000 of force sick daily.	Number transferred to hospital.	Number invalided from service.	Number of deaths.
			Disease.	Injury.	Total.							
Yards and marine barracks:												
Portsmouth	Year	91	56	14	70	769.23	309	.85	9.34	23	----	----
Boston	Year	289	161	14	175	605.54	477	1.31	4.53	78	----	1
New York	Year	349	215	55	270	773.64	1,146	3.14	8.99	70	----	1
Philadelphia	Year	151	118	26	144	953.64	377	1.03	6.82	51	----	----
Washington	Year	234	249	52	301	1,286.32	804	2.20	9.40	150	3	2
Norfolk	Year	158	97	7	104	658.23	493	1.35	8.54	52	----	1
Pensacola	Year	85	39	2	41	482.35	269	.74	8.71	13	1	----
Mare Island	Year	166	78	18	96	578.31	879	2.41	14.52	9	2	----
Marines—												
Headquarters	Year	208	194	33	227	1,091.34	1,019	2.79	13.41	77	----	----
Sitka	Year	40	3	1	4	100.00	------	------	------	6	----	----
Stations:												
Newport	Year	767	408	43	451	588.00	608	1.64	2.14	386	1	----
Annapolis	Year	410	356	61	417	1,017.07	2,661	7.29	17.78	5	----	2
Indian Head	Year	7	----	----	----	------	------	------	------	----	----	----
Port Royal	Year	66	27	7	34	515.15	287	.79	11.97	6	1	1
Key West	181 days	23	16	8	24	1,043.48	157	.87	16.74	2	----	3
Havana	275 days	34	51	8	59	1,735.12	292	1.05	23.33	----	----	4
San Juan	Year	40	52	12	64	1,600.00	1,315	3.60	99.00	5	----	2
Puget Sound	Year	55	26	10	36	654.55	301	.82	14.91	1	2	----
Island of Guam	122 days	50	141	14	155	3,100.00	1,918	15.72	104.80	4	----	5
Cavite	278 days	461	818	70	888	1,904.56	5,297	19.09	31.55	112	----	----
Special duty:												
New York	Year	----	3	2	5	------	87	------	------	----	----	----
Philadelphia	Year	----	22	----	22	------	151	------	------	4	----	----
Washington	Year	----	55	4	59	------	700	------	------	1	----	3
San Francisco	Year	----	5	1	6	------	50	------	------	1	----	2

TABLE VIII.—*Force afloat.—General aggregate, 1899.*

Classification of diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
Class I.												
Parasites and parasitic diseases	1	52	5	54	4	----	----	-----	---	----	-----	546
Class II.												
General infectious diseases (non-venereal)	56	1,870	180	1,723	338	7	4	-----	---	9	25	14,733
Class III.												
Constitutional disorders of nutrition	1	48	8	35	17	1	1	-----	---	----	3	639
Class IV.												
Diseases of the nervous system	23	998	92	914	157	14	10	3	---	4	11	7,034
Class V.												
Diseases of the visual apparatus	4	146	15	135	28	1	----	-----	---	----	1	1,372
Class VI.												
Diseases of the auditory apparatus	-----	106	12	96	18	3	----	-----	---	----	1	737
Class VII.												
Diseases of the olfactory apparatus	-----	47	-----	43	4	----	----	-----	---	----	----	153
Class VIII.												
Diseases of the nutritive apparatus:												
Subsidiary class 1—Diseases of the digestive apparatus	17	2,066	73	2,006	130	----	2	-----	2	1	15	9,206
Subsidiary class 2—Diseases of the circulatory apparatus	5	159	23	106	62	6	1	-----	---	5	7	2,428
Subsidiary class 3—Diseases of the respiratory apparatus	12	611	28	543	94	----	----	-----	---	1	13	4,489
Class IX.												
Diseases of the motory apparatus	8	435	43	403	74	1	----	-----	---	----	8	3,887
Class X.												
Diseases of the cutaneous apparatus	15	977	44	958	62	3	----	-----	---	----	13	7,983
Class XI.												
Venereal diseases and diseases of the genito-urinary apparatus	59	1,797	168	1,487	473	8	----	-----	1	----	55	24,973
Class XII.												
Cysts and new growths	-----	21	4	10	14	----	----	-----	---	1	-----	144
Class XIII.												
Injuries	46	2,205	83	2,024	226	5	1	-----	1	33	44	19,277
Class XIV.												
Extraneous bodies	-----	11	-----	10	1	----	----	-----	---	----	-----	42
Class XV.												
Poisons	5	262	8	251	15	1	----	-----	---	2	6	1,318
Class XVI.												
Feigned diseases	-----	2	1	2	------	1	----	-----	---	----	-----	8
Total	252	11,813	787	10,800	1,717	51	19	3	4	56	202	98,969

TABLE IX.—*Force afloat—Detailed statement, 1890.*

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS I.												
Parasites and parasitic diseases.												
Ascaris lumbricoides		3		3								34
Pulex penetrans		1		1								37
Scabies		7	1	7	1							78
Tænia		8	2	10								35
Tinea favosa		4		4								19
Tinea trichophytina	1	22	2	23	2							322
Trichinosis		1		1								7
Other diseases of this class		6		5	1							14
CLASS II.												
General infectious diseases (non-venereal).												
Cachexia malarialis		15	1	14	2							140
Catarrhus epidemicus	37	415	13	436	28		1					1,959
Cholera morbus		13		13								21
Denguis		31	1	26	2						4	154
Diphtheria		2			2							1
Dysenteria acuta		16	4	15	5							253
Dysenteria chronica		3	1	1	2						1	75
Erysipelas		14	1	6	8						1	157
Febris enterica	3	36	4	17	25					1		823
Febris intermittens	1	345	37	370	8						5	1,575
Febris pneumonica	3	50	2	23	30					1	1	421
Febris remittens	3	366	41	374	32		1			1	2	3,174
Morbilli		22		3	19							43
Parotitis epidemica	2	23		8	17							51
Pertussis		2		1	1							6
Rheumatismus articularis acutus	4	190	33	174	45		2			1	5	2,388
Rheumatismus articularis chronicus	2	78	25	68	34	2					1	960
Rubella		23		10	13							99
Scarlatina		11	1	1	11							32
Septicæmia		3		3								16
Tetanus		1		1								9
Tuberculosis miliaris acuta		1	1		1					1		86
Tuberculosis pneumonica acuta		13	4	2	14	1						425
Tuberculosis pneumonica chronica	1	44	10	9	38	4				1	3	866
Vaccina		146	1	145							2	968
Varicella		1		1								10
Variola		4			1					3		18
Other diseases of this class		2		2								3
CLASS III.												
Constitutional disorders of nutrition.												
Anæmia		27	5	18	11	1	1				1	307
Debilitas senilis	1	11	3	9	4						2	251
Diabetes mellitus		2		1	1							22
Hæmophilia		1		1								7
Leucocythæmia		2		2								4
Lithæmia		1		1								6
Pseudoleucocythæmia		1			1							2
Purpura hæmorrhagica		1		1								24
Other diseases of this class		2		2								16
CLASS IV.												
Diseases of the nervous system.												
Apoplexia		2								2		2
Atrophia muscularis progressiva		3		1	1							45
Cephalalgia		55	1	56								165

TABLE IX.—*Force afloat—detailed statement, 1899*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided. To hospital.	Invalided. From service.	Invalided. On leave.	Invalided. To Government Hospital for Insane.	Deserted.	Died.	Continued to next year.	Total number of sick days.
CLASS IV—continued.												
Diseases of the nervous system—Continued.												
Chorea		3		2	1							41
Dementia		10	1	2	7	2						165
Epilepsia	1	35	16	20	24	5	1				2	770
Febris continua simplex	10	215	8	224	9							1,185
Febris ephemera	3	219	4	222	2						2	720
Febris thermica		35	1	34	2							215
Hemicrania		1		1								2
Hemiplegia		3			3							19
Insomnia		3		3								6
Irritatio spinalis		2		1		1						35
Mania		6	1		7							23
Melancholia	3	25	4	5	22	1		3			1	335
Meningitis		1								1		8
Monoplegia		2		1	1							2
Nausea marina		55	17	63	7	2						391
Neuralgia		81	7	79	7		1				1	432
Neurasthenia	4	43	11	22	25	2	7				2	742
Neuritis		3	1	2	2							140
Neuritis multiplex		3	1		3						1	128
Neurosis hysteroidea	1	4	1	2	4							55
Paranoia		4	1	1	4							140
Paraplegia		2		2								12
Prostratio thermica		110	7	111	5					1		592
Sciatica	1	25	5	23	7		1					309
Sclerosis lateralis amyotrophica			2		2							48
Sclerosis spinalis posterior		3	1	1	3							121
Syncope		8		8								21
Vertigo		31	2	23	8						2	117
Other diseases of this class		7		5	1	1						48
CLASS V.												
Diseases of the visual apparatus.												
Amaurosis		2			2							0
Amblyopia		2			2							48
Asthenopia		1		1								1
Astigmatismus		1			1							0
Blepharitis		1		1								2
Cataracta		1			1							1
Choroiditis		3		2	1							10
Conjunctivitis	2	81	10	87	6							572
Corneæ ulcus		1		1								3
Dacryocystitis		1		1								57
Glaucoma		2			2							28
Hordeolus		3		3								11
Hypermetropia	1	1	1	1	2							49
Iritis	1	24	1	22	3						1	365
Keratitis		10	1	9	2							117
Leucoma			1		1							15
Myopia		4	1	2	2	1						23
Neuritis optica		2		1	1							52
Pterygium		2		2								9
Retinitis		2		1	1							3
Sclerotitis		1			1							0
Other diseases of this class		1		1								6
CLASS VI.												
Diseases of the auditory apparatus.												
Myringitis		2		2								7
Otalgia		13		12	1							55
Otitis externa		36	4	38	2							189
Otitis media		43	8	37	13	1						399
Surditas		10		6	1	2					1	85
Other diseases of this class		2		1	1							2

TABLE IX.—*Force afloat—Detailed statement, 1899*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS VII.												
Diseases of the olfactory apparatus.												
Rhinitis acuta		41		41								124
Rhinitis chronica		6		2	4							29
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.												
Susidiary class 1.—Diseases of the digestive apparatus.												
Adenitis salivosa		4		4								20
Ani rhagades		2		1	1							15
Appendicitis	3	36	3	24	18							318
Catarrhus gastricus acutus		112	2	108	6							407
Catarrhus gastricus chronicus		16	6	9	11						2	239
Catarrhus intestinalis acutus	1	141	3	135	8						2	716
Catarrhus intestinalis chronicus		8	7	10	5							186
Cholelithiasis		2		2								6
Colica		191	3	194								535
Constipatio	1	64	4	68	1							226
Dentis caries		11	1	12								62
Diarrhœa simplex	1	546	16	546	14				1		2	1,971
Dyspepsia nervosa		17		12	4		1					90
Fistula in ano		15		4	9		1				1	70
Gastralgia		14		14								40
Glottidis œdema		1								1		3
Hæmatemesis		1			1							2
Hæmorrhois	2	58	3	46	17							454
Hepatis congestio		16		14	1						1	57
Hepatitis acuta		2			2							26
Hepatitis chronica		1	1	1	1							22
Icterus	1	37	1	35	3						1	389
Obstructio intestinalis		5		1	4							31
Odontalgia		8		8								19
Odontolithus		1		1								2
Parulis		3		3								8
Periodontitis		14		14								36
Periproctitis		1			1							0
Peritonitis	1	12	2	14	1							74
Pharyngitis	1	67	1	69								251
Stomatitis		5		5								39
Tonsillitis	6	653	20	651	21				1		6	2,890
Uvula descendens		1			1							0
Other diseases of this class		1		1								2
Subsidiary class 2.—Diseases of the circulatory apparatus.												
A—Blood-vessels:												
Aneurysma		1		1								5
Angina pectoris		3	2	3	1						1	87
Arteriosclerosis	1	1		1	1							3
Cordis dilatatio		1		1								1
Cordis hypertrophia		4	1	2	3							54
Cordis palpitatio		29	4	18	12	1	1				1	419
Cordis valvularum morbus		33	6	11	21	3				4		468
Myocarditis		1								1		1
Pericarditis		3		1	1	1						60
Phlebitis		2	1	2							1	45
Varix		10	5	5	9	1						92
B—Lymphatics:												
Lymphadenitis	4	59	4	50	13						4	1,073
Lymphangitis		11		10	1							113
Other diseases of this class		1		1								7

TABLE IX.—*Force afloat—Detailed statement, 1899*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS—cont'd.												
Subsidiary class 3.—Diseases of the respiratory apparatus.												
Asthma		12	9	10	11							231
Bronchopneumonitis	2	10	1	4	6					1	2	195
Bronchitis acuta	4	298	3	279	18						8	1,798
Bronchitis chronica	1	40	9	22	26						2	601
Catarrhus bronchialis	1	156	4	150	10						1	805
Emphysema pulmonalis		2	1	2	1							8
Hæmoptysis	2	7		6	3							130
Laryngitis acuta	1	27		25	3							191
Laryngitis chronica		1	1	1	1							11
Œdema pulmonalis		1		1								6
Pleuritis acuta	1	42		35	8							398
Pleuritis chronica		7		4	3							45
Pneumothorax		2			2							9
Other diseases of this class		6		4	2							61
CLASS IX.												
Diseases of the motory apparatus.												
Ankylosis		8	7	3	12							334
Arthritis		15	2	12	5							198
Bursitis	1	22	3	23	3							288
Caries		2		1	1							8
Contractura		4		1	3							22
Myalgia acuta	4	282	13	283	11						5	1,560
Myalgia chronica		28	4	16	12	1					3	564
Necrosis		1			1							0
Ostitis		1	2	1	2							24
Osteomyelitis		1			1							27
Periostitis	1	14	4	11	8							178
Synovitis	1	48	8	43	14							572
Thecitis	1	5		5	1							71
Other diseases of this class		4		4								41
CLASS X.												
Diseases of the cutaneous apparatus.												
Abscessus	9	364	15	363	19						6	2,919
Acne		5	1	6								69
Carbunculus		16		14	2							82
Cellulitis	2	50	1	45	6						2	303
Clavus		12		12								127
Cutis fissuræ		5	2	5	2							43
Ecthyma		8		7	1							83
Eczema		70	3	61	11						1	713
Erythema		7		6	1							21
Furunculus	3	224	13	235	2	1					2	1,328
Herpes simplex		4		4								47
Herpes zoster		11		10	1							78
Impetigo		17		17								137
Lichen		8		8								75
Onychia		7		6	1							93
Paronychia		24		23	1							198
Pemphigus		5		5								37
Prurigo		2		1	1							3
Psoriasis			1	1								3
Ulcus	1	92	6	84	12	2					1	1,182
Unguis involutus		18	1	18							1	248
Urticaria		18		18								78
Verruca		5	1	5	1							58
Other diseases of this class		5		4	1							58

TABLE IX.—*Force afloat—Detailed statement, 1899*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS XI.												
Venereal diseases and diseases of the genito-urinary apparatus.												
Adenitis inguinalis (venereal)	21	443	34	365	110						23	8,479
Arthritis gonorrhoica	1	39	7	28	18						1	879
Balanitis		14	1	13	2							146
Chancroid	2	184	7	153	37						3	2,607
Cystitis	2	39	3	29	12						3	532
Enuresis	1	14	1	8	8							97
Epididymitis	3	140	15	126	26						6	1,767
Gonorrhœa	6	329	18	284	61				1		7	2,996
Hæmaturia		1		1								9
Hydrocele		6	1	6	1							76
Nephritis acuta		10	1	5	6							88
Nephritis chronica		11	1	4	7						1	57
Nephrolithiasis		5	1	5	1							44
Ophthalmia gonorrhoica		5		3	2							51
Orchitis	7	125	11	122	19						2	1,532
Paraphimosis		14	1	13	2							94
Phimosis	1	45	1	37	8						2	578
Prostatitis		6	1	3	4							56
Syphilis consecutiva	11	264	56	212	108	7					4	3,582
Syphilis primitiva	4	56	4	44	19						1	945
Urethræ strictura		22	2	11	12						1	93
Urethritis simplex		1			1							3
Urina suppressa		2		1	1							21
Urinæ retentio		4		2	2							15
Varicocele		11	2	7	6							134
Verruca acuminata		5		4							1	62
Other diseases of this class		2		1		1						30
CLASS XII.												
Cysts and new growths.												
Adenoma		1	1		2							16
Carcinoma		2	2		3					1		43
Chondroma		1		1								12
Cystis		5		3	2							25
Epithelioma		1		1								6
Fibroma		3		3								24
Lipoma		5	1	2	4							16
Myxoma		2			2							1
Neuroma		1			1							1
CLASS XIII.												
Injuries.												
Abrasio	2	74	1	76							1	493
Ambustio ex calore	1	140	4	133	9						3	1,301
Ambustio ex frigore		17		13	4							63
Asphyxia		3		1						2		10
Asphyxia ex submersione		15			2					13		12
Concussio		28	4	22	9					1		205
Contusio	8	492	5	482	15						8	3,027
Deformitas	1	24	2	12	12	2					1	238
Fames		1		1								2
Fractura	12	126	13	94	46		1			4	6	2,702
Fulminis ictus		4		1	3							24
Hernia	2	74	23	27	67	3					2	1,047
Luxatio	1	35	1	27	10							407
Membranæ tympani ruptio		4		3	1							23
Musculi ruptio		1		1								20
Visceris ruptio		1			1							1
Sole excoctus		21		21								116
Stremma	6	402	6	393	13				1		7	3,020
Virium defectio		4		4								33
Vulnus contusum	4	218	6	216	9						3	1,821

TABLE IX.—*Force afloat—Detailed statement, 1899*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS XIII—continued.												
Injuries—Continued.												
Vulnus incisum	-----	133	7	130	7	----	----	-----	---	----	3	998
Vulnus laceratum	7	261	4	262	4	----	----	-----	---	----	6	2,421
Vulnus punctum	2	72	4	77	1	----	----	-----	---	----	----	614
Vulnus sclopeticum	-----	51	3	24	13	----	----	-----	---	13	4	634
Other diseases of this class	-----	4	-----	4	------	----	----	-----	---	----	-----	45
CLASS XIV.												
Extraneous bodies.												
Corpus extraneum	-----	11	-----	10	1	----	----	----	---	----	-----	42
CLASS XV.												
Poisons.												
Alcoholismus	3	155	4	146	11	1	----	-----	---	2	2	485
Dermatitis venenata	-----	10	-----	10	------	----	----	-----	---	----	-----	53
Venenum irritans	-----	12	-----	12	------	----	----	-----	---	----	-----	58
Venenum neuroticum	1	9	-----	9	1	----	----	-----	---	----	-----	28
Vulnus venenatum	1	61	2	59	2	----	----	-----	---	----	3	596
Other diseases of this class	-----	15	2	15	1	----	----	-----	---	----	1	98
CLASS XVI.												
Feigned diseases.												
Ankylosis	-----	1	-----	1	------	----	---	-----	---	----	-----	2
Hypochondriasis	-----	1	1	1	------	1	----	-----	---	----	-----	6
Total	252	11,813	787	10,800	1,717	51	19	3	4	56	202	98,969

TABLE X.—*Navy-yards and other shore stations—General aggregate, 1899.*

Classification of diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
Class I.												
Parasites and parasitic diseases	-----	18	1	15	4	----	----	-----	---	----	-----	98
Class II.												
General infectious diseases (non-venereal)	41	1,266	80	925	418	1	6	-----	1	16	20	6,762
Class III.												
Constitutional disorders of nutrition	-----	14	1	10	4	----	----	-----	---	----	1	87
Class IV.												
Diseases of the nervous system	1	308	16	261	51	4	1	-----	---	1	7	1,620
Class V.												
Diseases of the visual apparatus	4	44	19	60	5	----	----	-----	---	----	2	431
Class VI.												
Diseases of the auditory apparatus	-----	17	-----	12	5	----	----	-----	---	----	-----	138
Class VII.												
Diseases of the olfactory apparatus	-----	20	-----	18	1	----	---	-----	---	----	1	58
Class VIII.												
Diseases of the nutritive apparatus:												
Subsidiary class 1—Diseases of the digestive apparatus	2	574	22	467	117	----	1	-----	---	2	11	1,973
Subsidiary class 2—Diseases of the circulatory apparatus	-----	38	9	27	15	1	2	-----	---	1	1	461
Subsidiary class 3—Diseases of the respiratory apparatus	5	223	6	178	50	1	----	-----	---	----	5	1,041
Class IX.												
Diseases of the motory apparatus	-----	84	9	74	13	3	----	-----	---	----	3	526
Class X.												
Diseases of the cutaneous apparatus	1	186	9	149	37	----	----	-----	---	----	10	1,349
Class XI.												
Venereal diseases and diseases of the genito-urinary apparatus	6	395	37	180	241	----	1	-----	---	----	16	2,056
Class XII.												
Cysts and new growths	-----	3	-----	1	1	---	----	-----	---	----	1	134
Class XIII.												
Injuries	7	403	18	335	75	4	----	-----	---	6	8	2,690
Class XIV.												
Extraneous bodies	-----	1	-----	--------	1	----	----	-----	---	----	-----	------
Class XV.												
Poisons	-----	59	3	42	18	----	----	-----	---	1	1	174
Total	67	3,653	230	2,754	1,056	14	11	-----	1	27	87	19,598

TABLE XI.—*Navy-yards and shore stations—Detailed statement, 1899.*

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS I.												
Parasites and parasitic diseases.												
Scabies		3		1	2							8
Tænia		3		2	1							9
Tinea trichophytina		4	1	4	1							24
Other diseases of this class		8		8								57
CLASS II.												
General infectious diseases (non-venereal.)												
Cachexia malarialis	1	33	2	25	6	1	3				1	231
Catarrhus epidemicus	35	254	5	197	97							1,137
Cholera morbus		6		6								17
Denguis		265	14	273	4						2	1,477
Dysenteria acuta		43		25	14						4	280
Dysenteria chronica		1	1		1					1		24
Erysipelas		5		4	1							66
Febris cerebro-spinalis		1								1		4
Febris enterica		67	1	13	37		1			7	10	1,047
Febris flava		8		3	1					4		81
Febris intermittens	1	179	33	158	52				1		2	755
Febris pneumonica	2	43		5	39					1		181
Febris remittens		117	16	93	38		1			1		546
Morbilli		13		3	10							36
Paralysis ascendens acuta	1	3		3			1					36
Parotitis epidemica		68		5	63							23
Pertussis		1		1								1
Rheumatismus articularis acutus		44	7	30	21							242
Rheumatismus articularis chronicus	1	22		18	5							160
Rubella		3		1	2							4
Scarlatina		16			16							0
Septicæmia		1								1		5
Tuberculosis miliaris acuta		1		1								6
Tuberculosis pneumonica acuta		2			2							6
Tuberculosis pneumonica chronica		6	1		6						1	66
Vaccina		62		60	2							316
Varicella		2		1	1							15
CLASS III.												
Constitutional disorders of nutrition.												
Anæmia		9		6	2						1	60
Debilitas senilis		1		1								6
Diabetes insipidus		1			1							13
Lithæmia		1	1	2								7
Other diseases of this class		2		1	1							1
CLASS IV.												
Diseases of the nervous system.												
Apoplexia		1								1		1
Atrophia muscularis progressiva		1	1	2								18
Cephalalgia		21		20	1							40
Chorea		1			1							6
Dementia		2			2							1
Epilepsia		14	2	5	7	4						129
Febris continua simplex		170	7	155	19						3	928
Febris ephemera		8		7							1	45
Insomnia		2		2								4
Irritatio spinalis		2			2							4

TABLE XI.—*Navy-yards and shore stations—Detailed statement, 1899*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS IV—continued.												
Diseases of the nervous system—Continued.												
Mania	-----	3	-----	1	2	----	----	-----	---	----	-----	2
Melancholia	-----	4	1	1	3	----	----	-----	---	----	1	80
Nausea marina	-----	2	-----	2	-----	----	----	-----	---	----	-----	7
Neuralgia	-----	31	3	29	4	----	----	-----	---	----	1	118
Neurasthenia	-----	7	-----	4	3	----	----	-----	---	----	-----	86
Neuritis	-----	5	1	5	-----	----	----	-----	---	----	1	21
Neurosis hysteroidea	-----	1	-----	1	-----	----	----	-----	---	----	-----	6
Paranoia	-----	2	-----	2	-----	----	----	-----	---	----	-----	2
Prostratio thermica	-----	9	-----	7	2	----	----	-----	---	----	-----	16
Sciatica	1	4	-----	4	1	----	----	-----	---	----	-----	38
Sclerosis spinalis posterior	-----	1	-----	-----	-----	----	1	-----	---	----	-----	11
Syncope	-----	3	-----	3	-----	----	----	-----	---	----	-----	4
Torticollis spasmodica	-----	1	-----	1	-----	----	----	-----	---	----	-----	1
Vertigo	-----	11	1	10	2	----	----	-----	---	----	-----	39
Other diseases of this class	-----	2	-----	-----	2	----	----	-----	---	----	-----	13
CLASS V.												
Diseases of the visual apparatus.												
Amaurosis	-----	1	-----	-----	1	----	----	-----	---	----	-----	21
Asthenopia	1	8	10	19	-----	----	----	-----	---	----	-----	132
Astigmatismus	-----	2	1	3	-----	----	----	-----	---	----	-----	9
Conjunctivitis	1	13	5	16	2	----	----	-----	---	----	1	87
Hordeolus	-----	3	1	4	-----	----	----	-----	---	----	-----	13
Hypermetropia	-----	4	-----	3	-----	----	----	-----	---	----	1	21
Iritis	1	2	-----	3	-----	----	----	-----	---	----	-----	26
Keratitis	-----	2	1	3	-----	----	----	-----	---	----	-----	61
Myopia	-----	6	1	7	-----	----	----	-----	---	----	-----	53
Pterygium	-----	2	-----	1	1	----	----	-----	---	----	-----	3
Trachoma	1	-----	-----	-----	1	----	----	-----	---	----	-----	4
Other diseases of this class	-----	1	-----	1	-----	----	----	-----	---	----	-----	1
CLASS VI.												
Diseases of the auditory apparatus.												
Otalgia	-----	1	-----	1	-----	----	----	-----	---	----	-----	2
Otitis externa	-----	5	-----	4	1	----	----	-----	---	----	-----	41
Otitis media	-----	9	-----	6	3	----	----	-----	---	----	-----	91
Surditas	-----	2	-----	1	1	----	----	-----	---	----	-----	4
CLASS VII.												
Diseases of the olfactory apparatus.												
Catarrhus æstivus	-----	1	-----	1	-----	----	----	-----	---	----	-----	2
Rhinitis acuta	-----	16	-----	15	-----	----	----	-----	---	----	1	54
Rhinitis chronica	-----	1	-----	-----	1	----	----	-----	---	----	-----	0
Other diseases of this class	-----	2	-----	2	-----	----	----	-----	---	----	-----	2
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.												
Subsidiary class 1.—Diseases of the digestive apparatus.												
Adenitis salivosa	-----	1	-----	-----	1	----	----	-----	---	----	-----	0
Appendicitis	-----	10	2	4	8	----	----	-----	---	----	-----	64
Catarrhus gastricus acutus	-----	48	2	45	5	----	----	-----	---	----	-----	179
Catarrhus gastricus chronicus	-----	8	1	5	4	----	----	-----	---	----	-----	54
Catarrhus intestinalis acutus	-----	24	-----	20	4	----	----	-----	---	----	-----	147
Catarrhus intestinalis chronicus	-----	3	-----	1	2	----	----	-----	---	----	-----	3
Cholelithiasis	-----	1	-----	-----	1	----	----	-----	---	----	-----	1

TABLE XI.—*Navy-yards and shore stations—Detailed statement, 1899*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS—cont'd.												
Subsidiary class 1.—Diseases of the digestive apparatus—Cont'd.												
Colica		18	1	18	1							65
Constipatio		25		24	1							54
Dentis caries		5		5								7
Diarrhœa simplex		177	11	174	9						5	596
Dyspepsia nervosa		4		4								9
Fistula in ano		2			1		1					7
Gastralgia		14		12	2							24
Hæmorrhoids		17	1	10	6						2	148
Hepatis congestio		5		5								16
Hepatitis acuta		1			1							0
Hepatitis chronica		3			1					2		6
Icterus		8	1	6	3							33
Obstructio intestinalis		1		1								7
Odontalgia		3	1	4								10
Parulis		6	1	7								29
Periproctitis		1			1							15
Peritonitis	1	3		3	1							32
Pharyngitis		21		19	2							85
Stomatitis		46		2	44							5
Tonsillitis	1	117	1	97	18						4	374
Typhlitis		1		1								3
Other diseases of this class		1			1							0
Subsidiary class 2.—Diseases of the circulatory apparatus.												
A—Blood vessels:												
Aneurysma		1			1							0
Angina pectoris		4		1	3							62
Cordis palpitatio		13	4	15	1						1	147
Cordis valvularum morbus		7	3	3	3	1	2			1		71
Varix		4	1	3	2							18
B—Lymphatics:												
Lymphadenitis		8	1	5	4							163
Lymphangitis		1			1							0
Subsidiary class 3.—Diseases of the respiratory apparatus.												
Asthma		4		3	1							46
Bronchitis acuta	3	111	4	84	32						2	515
Bronchitis chronica		3		1	2							23
Catarrhus bronchialis	2	77	1	72	5						3	337
Emphysema pulmonalis		1	1	1		1						10
Hæmoptysis		3		2	1							4
Laryngitis acuta		11		11								74
Laryngitis chronica		4		2	2							9
Pleuritis acuta		8		1	7							22
Other diseases of this class		1		1								1
CLASS IX.												
Diseases of the motory apparatus.												
Ankylosis		2		1		1						14
Arthritis		5	1	5		1						96
Contractura		1			1							0
Myalgia acuta		65	7	63	7						2	348
Myalgia chronica		2		1	1							4
Necrosis		1			1							1
Periostitis		1			1							0
Synovitis		6	1	4	1	1					1	61
Thecitis		1			1							2

TABLE XI.—*Navy-yards and shore stations—Detailed statement, 1899*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided. To hospital.	Invalided. From service.	Invalided. On leave.	Invalided. To Government Hospital for Insane.	Deserted.	Died.	Continued to next year.	Total number of sick days.
CLASS X.												
Diseases of the cutaneous apparatus.												
Abcessus	1	67	2	57	11						2	459
Carbunculus		5		5								80
Cellulitis		9		3	6							70
Clavus		2		2								6
Eczema		12	1	9	3						1	70
Erythema		5		2	3							12
Furunculus		43	1	38	3						3	248
Herpes zoster		2		1	1							12
Impetigo		6		5							1	23
Paronychia		1		1								2
Pemphigus		1			1							0
Pernio		1		1								17
Psoriasis		1			1							3
Ulcus		14	1	11	2						2	199
Unguis involutus		8		2	6							23
Urticaria		7		7								19
Verruca		1		1								8
Other diseases of this class		1	4	4							1	98
CLASS XI.												
Venereal diseases and diseases of the genito-urinary apparatus.												
Adenitis inguinalis (venereal)	3	50	6	30	23						6	707
Arthritis gonorrhoica		2		1	1							5
Balanitis		1			1							0
Calculus		1		1								1
Chancroid		33	5	22	14						2	178
Cystitis		7	1	4	4							47
Enuresis		2		1	1							7
Epididymitis		17	4	9	11						1	144
Gonorrhœa	1	176	7	67	117							333
Nephritis acuta	1	2	1	2	2							14
Nephritis chronica		4			2		1				1	23
Nephrolithiasis		4	1	4	1							20
Orchitis		22	2	8	13						3	115
Paraphimosis		2		2								37
Phimosis		3		1	1						1	20
Prostatitis		3		3								23
Spermatorrhœa		1			1							0
Syphilis consecutiva		29	4	13	19						1	231
Syphilis primitiva		27	5	9	22						1	77
Urethræ strictura	1	2		1	2							30
Urinæ retentio		1		1								1
Varicocele		2			2							0
Verruca acuminata		3			3							15
Other diseases of this class		1	1	1	1							28
CLASS XII.												
Cysts and new growths.												
Fibroma		2		1							1	127
Lipoma		1			1							7
CLASS XIII.												
Injuries.												
Abrasio		14		14								52
Ambustio ex calore		21		18	2						1	173
Ambustio ex frigore		2		2								14
Asphyxia ex submersione		4								4		4
Concussio		1		1								6
Contusio		78	4	70	12							344

TABLE XI.—*Navy-yards and shore stations—Detailed statement, 1899*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS XIII—continued.												
Injuries—Continued.												
Deformitas	-----	3	2	1	2	2	----	-----	---	----	-----	41
Fractura	3	24	4	16	14	----	----	-----	---	1	-----	390
Hernia	-----	16	1	8	6	2	----	-----	---	----	1	130
Luxatio	-----	10	-----	6	4	----	----	-----	---	----	-----	56
Musculi ruptio	-----	1	-----	1	-----	----	----	-----	---	----	-----	2
Stremma	-----	81	3	73	7	----	----	-----	---	----	4	490
Virium defectio	-----	1	-----	1	-----	----	----	-----	---	----	-----	6
Vulnus contusum	-----	35	-----	29	5	----	----	-----	---	----	1	214
Vulnus incisum	3	38	1	39	3	----	----	-----	---	----	-----	260
Vulnus laceratum	1	39	1	36	4	----	----	-----	---	----	1	350
Vulnus punctum	-----	12	-----	11	1	----	----	-----	---	----	-----	50
Vulnus sclopeticum	-----	23	2	9	15	----	----	-----	---	1	-----	108
CLASS XIV.												
Extraneous bodies.												
Corpus extraneum	-----	1	-----	--------	1	----	----	-----	---	----	-----	0
CLASS XV.												
Poisons.												
Alcoholismus	-----	38	3	31	10	----	----	-----	---	----	-----	109
Dermatitis venenata	-----	9	-----	7	2	----	----	-----	---	----	-----	29
Venenum neuroticum	-----	1	-----	--------	1	----	----	-----	---	----	-----	0
Vulnus venenatum	-----	11	-----	4	5	----	----	-----	---	1	1	36
Total	67	3,653	230	2,754	1,056	14	11	-----	1	27	87	19,598

TABLE XII.—*Naval hospitals—General aggregate, 1899.*

Classification of diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick-days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
Class I.												
Parasites and parasitic diseases	1	2	8	8	1	1	----	----	---	----	1	589
Class II.												
General infectious diseases (non-venereal)	90	112	747	712	57	76	11	----	---	27	66	26,913
Class III.												
Constitutional disorders of nutrition	3	4	22	11	4	8	2	----	---	----	4	1,134
Class IV.												
Diseases of the nervous system	11	19	202	97	25	55	9	26	1	2	17	6,886
Class V.												
Diseases of the visual apparatus	8	3	36	19	4	16	----	----	---	----	8	2,089
Class VI.												
Diseases of the auditory apparatus	5	1	20	14	1	9	----	----	---	----	2	1,097
Class VII.												
Diseases of the olfactory apparatus	----	1	7	5	2	1	----	----	---	----	----	305
Class VIII.												
Diseases of the nutritive apparatus:												
Subsidiary class 1—Diseases of the digestive apparatus	23	20	230	205	21	18	7	----	1	6	15	6,771
Subsidiary class 2—Diseases of the circulatory apparatus	6	6	71	25	12	32	2	----	---	5	7	3,565
Subsidiary class 3—Diseases of the respiratory apparatus	24	9	141	116	20	24	2	----	---	2	10	5,176
Class IX.												
Diseases of the motory apparatus	13	4	84	49	19	22	2	----	---	----	9	4,124
Class X.												
Diseases of the cutaneous apparatus	11	8	102	89	4	12	2	----	1	----	13	5,144
Class XI.												
Venereal diseases and diseases of the genito-urinary apparatus	131	75	698	654	38	90	2	----	5	3	112	37,902
Class XII.												
Cysts and new growths	3	4	15	12	3	2	----	----	---	3	2	1,031
Class XIII.												
Injuries	60	14	284	210	30	76	1	----	1	6	34	13,777
Class XIV.												
Extraneous bodies	1	----	2	1	----	2	----	----	---	----	----	134
Class XV.												
Poisons	2	----	32	26	1	4	----	----	---	3	----	495
Class XVI.												
Feigned diseases	----	1	1	2	----	----	----	----	---	----	----	26
Total	392	283	2,702	2,255	242	448	40	26	9	57	300	117,158

TABLE XIII.—*Naval hospitals—Detailed statement, 1899.*

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS I.												
Parasites and parasitic diseases.												
Echinococcus		1		1								194
Scabies	1		3	2	1						1	301
Tænia		1	1	1		1						47
Tinea trichophytina			4	4								47
CLASS II.												
General infectious diseases (non-venereal).												
Cachexia malarialis	4	1	7	7	2	2	1					643
Catarrhus epidemicus	14	3	128	140	2	1	1				1	1,979
Denguis		1	5	6								47
Diphtheria			2	2								27
Dysenteria acuta	1	3	15	13	3		1				2	474
Dysenteria chronica		2	6	4	2		1				1	246
Erysipelas	2	2	9	10		2					1	234
Febris cerebro-spinalis		1								1		4
Febris enterica	17	31	59	80	4	1	3			3	16	4,229
Febris intermittens	2	1	56	55	3	1						1,034
Febris pneumonica	11	24	70	79	3	1	1			13	8	3,457
Febris remittens	12	3	73	75	7	1	2				3	1,790
Morbilli	4	2	30	32	2						2	728
Parotitis epidemica	4	3	80	87								1,871
Pyæmia			1	1								3
Rheumatismus articularis acutus	6	3	64	47	7	7					12	3,188
Rheumatismus articularis chronicus	4	1	37	17	6	10					9	1,638
Rubella			13	12	1							169
Scarlatina	3	2	27	26	3	1				2		1,013
Septicæmia		1		1								13
Tuberculosis miliaris acuta		3	3		1	3				2		297
Tuberculosis pneumonica acuta	2	4	14	5	3	9				1	2	968
Tuberculosis pneumonica chronica	3	18	44	7	8	37	1			4	8	2,690
Tuberculosis of other parts		1		1								27
Vaccina	1		1	1							1	24
Varicella			1	1								18
Variola		2	2	3						1		102
CLASS III.												
Constitutional disorders of nutrition.												
Anæmia	1	3	14	9	2	2	2				3	513
Debilitas senilis			4			3					1	185
Diabetes insipidus			1		1							38
Diabetes mellitus		1	2		1	2						115
Lithæmia	2			2								232
Pseudoleucocythæmia			1			1						51
CLASS IV.												
Diseases of the nervous system.												
Aphasia	1					1						10
Atrophia muscularis progressiva			1			1						152
Cephalalgia			1								1	41
Chorea			2	2								78
Dementia		1	10	2	1	1		7				427
Encephalitis			1	1								24
Epilepsia	1	1	27	4	4	18					3	737
Febris continua simplex	2	3	37	37	4	1						547
Febris ephemera			2	2								16

TABLE XIII.—*Naval hospitals—Detailed statement, 1899*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS IV—continued.												
Diseases of the nervous system—Continued.												
Febris thermica			1		1							63
Hemiplegia	1	2	4	1		2				2	2	545
Irritatio spinalis			2	1							1	55
Mania		1	9	2	1	1		5			1	156
Melancholia		3	19	3	4	3		12				549
Meningitis		1	1	1		1						148
Monoplegia	1								1			1
Nausea marina			6	1		5						57
Neuralgia		3	11	5	1	3	1				4	429
Neurasthenia	2	2	27	13	4	6	6				2	929
Neuritis	1		2	1		2						101
Neuritis multiplex		1	4		2		1				2	269
Neurosis hysteroidea			4	1		2					1	172
Paranoia	1		2	2				1				45
Prostratio thermica			4	3		1						53
Sciatica			9	6		2	1					628
Sclerosis lateralis amyotrophica		1	2		2	1						75
Sclerosis spinalis posterior			2	1				1				35
Syncope			2	2								17
Vertigo	1		8	6		3						510
Other diseases of this class			2		1	1						17
CLASS V.												
Diseases of the visual apparatus.												
Amaurosis			3			2					1	84
Amblyopia			2	1							1	171
Asthenopia	1			1								26
Astigmatismus			1			1						69
Cataracta			1	1								64
Chalazion			1	1								4
Choroiditis	1		2	1	1	1						115
Conjunctivitis	1		6	4	1	1					1	333
Corneæ ulcus		1	1			1					1	73
Glaucoma			3	1	1						1	42
Hypermetropia			2	1		1						110
Iritis	1		3	1		3						170
Keratitis	1	1	2	1	1						2	223
Myopia	1		3	1		3						72
Neuritis optica	1	1	1	2		1						99
Pterygium			1								1	98
Retinitis	1		1	1		1						210
Sclerotitis			1	1								27
Synechia			1			1						84
Trachoma			1	1								15
CLASS VI.												
Diseases of the auditory apparatus.												
Otitis externa			3	3								108
Otitis media	4	1	15	9	1	8					2	875
Surditas	1		2	2		1						114
CLASS VII.												
Diseases of the olfactory apparatus.												
Rhinitis chronica		1	7	5	2	1						305

TABLE XIII.—*Naval hospitals—Detailed statement, 1899*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS VIII.—DISEASES OF THE NUTRITIVE APPARATUS.												
Subsidiary class 1.—Diseases of the digestive appraratus.												
Ani rhagades			1	1								2
Appendicitis	3	4	20	18	2					3	4	1,228
Catarrhus gastricus acutus			7	7								118
Catarrhus gastricus chronicus		1	22	10	6	3	2		1		1	754
Catarrhus intestinalis acutus	1		9	9		1						196
Catarrhus intestinalis chronicus	1		6	5	1					1		251
Cholelithiasis		1					1					41
Colica	1		3	4								20
Constipatio			2	1		1						19
Diarrhea simplex	1	1	11	8	3	2						339
Dyspepsia nervosa	1		4	5								209
Fistula in ano	3	2	11	11	2	1					2	735
Gastralgia			2	2								8
Hæmatemesis			1								1	32
Hæmorrhois	3	4	21	21	1	4	1				1	616
Hepatis congestio			1			1						59
Hepatitis acuta			3	1	2							33
Hepatitis chronica		1	2		1		1			1		107
Hypertrophia tonsillaris		1				1						9
Icterus	1		5	5		1						125
Obstructio intestinalis			2	1							1	167
Periproctitis		1	2	3								151
Peritonitis			3	2		1						120
Pharyngitis			2	2								21
Stomatitis			1	1								5
Tonsillitis	8	3	82	85	2	1	1				4	1,240
Ulcus gastricum			1							1		1
Uvula descendens			1								1	17
Other diseases of this class		1	5	3	1	1	1					148
Subsidiary class 2.—Diseases of the circulatory apparatus.												
A—Blood vessels:												
Aneurysma	2	1	3		1	2				2	1	423
Angina pectoris			3	1	1	1						91
Arteriosclerosis			1			1						17
Cordis hypertrophia			3		1	1					1	116
Cordis palpitatio			11	1	2	6					2	335
Cordis valvularum morbus	1	2	20	1	1	16	1			3	1	737
Endocarditis		1	1	1	1							34
Pericarditis			1			1						91
Varix			12	4	3	3	1				1	764
B—Lymphatics:												
Lymphadenitis	3	2	15	16	2	1					1	944
Lymphangitis			1	1								13
Subsidiary class 3.—Diseases of the respiratory apparatus.												
Asthma			12	6	1	4					1	308
Bronchopneumonitis	5	1	6	7	1	2				2		501
Bronchitis acuta	5		50	43	5	2					5	1,093
Bronchitis chronica	6		28	18	8	7	1					1,452
Catarrhus bronchialis	2		14	15							1	384
Hæmoptysis	2	1	7	6	2	2						561
Laryngitis acuta		1	1	2								20
Laryngitis chronica	1		4	3		2						116
Pleuritis acuta	3	2	11	14		1					1	284
Pleuritis chronica		2	6	1	2	2	1				2	274
Pleuritis purulenta		2	1	1	1	1						133
Pneumothorax			1			1						50

TABLE XIII.—*Naval hospitals—Detailed statement, 1899*—Continued.

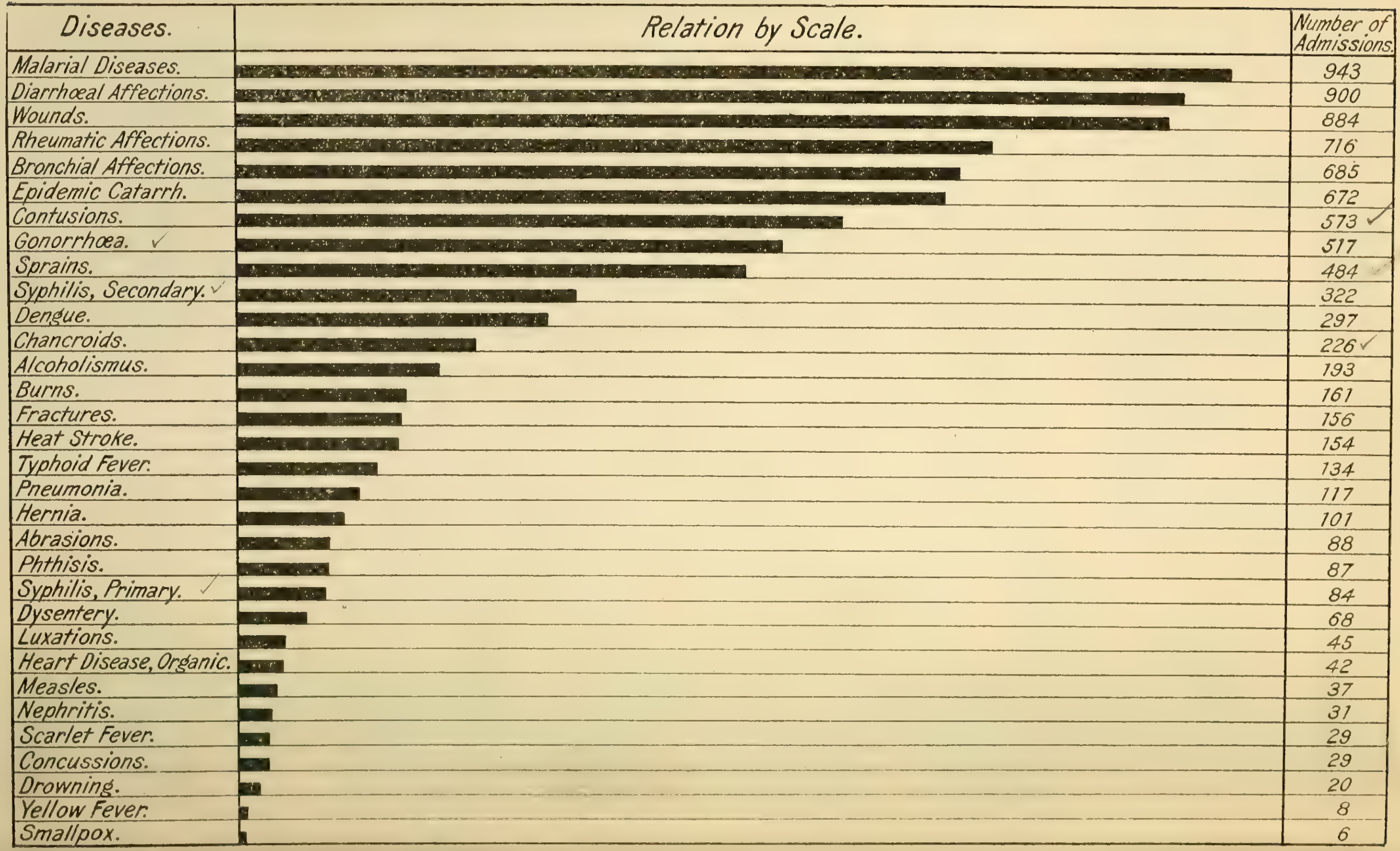
Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS IX.												
Diseases of the motory apparatus.												
Anchylosis			12	1	5	5					1	373
Arthritis	2		5	5	1	1						269
Bursitis			2	1							1	210
Caries			1	1								53
Contractura			4			3					1	158
Myalgia acuta			13	9	3	1						356
Myalgia chronica	4	1	13	12	3	2					1	529
Necrosis	2		2	1		2	1					182
Ostitis			1	1								192
Osteomyelitis	1	3	1	1		2					2	317
Periostitis	1		12	3	5	3					2	522
Synovitis	3		15	12	2	2	1				1	788
Thecitis			2	2								148
Other diseases of this class			1			1						27
CLASS X.												
Diseases of the cutaneous apparatus.												
Abscessus	4	3	29	28		5					3	1,388
Acne			1	1								106
Carbunculus			3	3								55
Cellulitis	1		13	11	1						2	535
Clavus			1						1			27
Cutis fissuræ			1	1								37
Ecthyma			1			1						61
Eczema			16	8	1	2	1				4	765
Erythema		1	1	2								62
Furunculus		1	5	5							1	99
Herpes zoster			2	2								146
Impetigo	1			1								20
Onychia			1	1								37
Paronychia	1		1	2								38
Pemphigus		1	1	1		1						154
Prurigo			1	1								11
Psoriasis		1	1	2								38
Ulcus	3	1	13	11	1	3	1				1	1,210
Unguis involutus			7	6							1	129
Verruca			1	1								42
Other diseases of this class	1		3	2	1						1	184
CLASS XI.												
Venereal diseases and diseases of the genito-urinary apparatus.												
Adenitis inguinalis (venereal)	29	6	132	131	6	8					22	7,513
Arthritis gonorrhoica	6	7	19	15	1	9			1		6	1,500
Balanitis			3	2	1							152
Chancroid	17	9	49	57	6	3					9	2,962
Cystitis	2	1	14	11	1	2	1				2	801
Enuresis			9	3	1	2			1		2	157
Epididymitis	6		32	29	1	1					7	1,400
Gonorrhœa	35	12	179	184	8	9			1		24	8,257
Hæmaturia	1		1	1							1	55
Hydrocele			1	1								21
Nephritis acuta	2		8	6		3				1		465
Nephritis chronica		4	8	5		4					3	848
Nephrolithiasis			2	2								23
Ophthalmia gonorrhoica			2	1							1	126
Orchitis	6	1	31	34	2	2						1,415
Paraphimosis			2		2							10
Phimosis	1		8	8							1	264
Prostatitis			4	1		2					1	176
Spermatorrhœa			1			1						13
Syphilis consecutiva	19	29	125	107	4	35			1	2	24	8,633
Syphilis primitiva	2	1	36	29	3	3			1		3	1,957
Urethræ strictura	3	4	16	13	2	2					6	791

TABLE XIII.—*Naval hospitals—Detailed statement, 1899*—Continued.

Diseases.	Remaining from last year.	Admitted.	Readmitted.	Discharged to duty.	Invalided.				Deserted.	Died.	Continued to next year.	Total number of sick days.
					To hospital.	From service.	On leave.	To Government Hospital for Insane.				
CLASS XI—continued.												
Venereal diseases and diseases of the genito-urinary apparatus—Continued.												
Urethritis simplex	1		1	1		1						30
Urina suppressa			2	2								46
Urinæ retentio			1	1								2
Varicocele	1		9	6		3	1					174
Verruca acuminata		1	3	4								111
CLASS XII.												
Cysts and new growths.												
Adenoma			2	1	1							64
Carcinoma	1	2	2			1				3	1	229
Cystis	1		2	2	1							125
Epithelioma	1	1		2								83
Fibroma			1		1							294
Lipoma			4	4								46
Myxoma			4	3		1						132
Sarcoma		1									1	58
CLASS XIII.												
Injuries.												
Ambustio ex calore			12	11						1		342
Ambustio ex frigore			4	3		1						197
Asphyxia ex submersione		1	2	2						1		20
Concussio			4	2	1					1		114
Contusio	2	3	29	27	2	2					3	919
Deformitas			10	4		6						230
Fractura	32	6	54	66	5	14					7	4,743
Fulminis ictus			1			1						13
Hernia	8	1	73	20	11	42	1		1		7	3,090
Luxatio	4		13	10	1	4				1	1	569
Membranæ tympani ruptio			1	1								18
Musculi ruptio			1								1	1
Stremma	2	1	22	20	2						3	717
Vulnus contusum	2		13	12	2						1	285
Vulnus incisum			10	8	1						1	176
Vulnus laceratum	2	2	10	10	1	1					2	343
Vulnus punctum	3		1	3		1						172
Vulnus sclopeticum	5		23	10	4	4				2	8	1,781
Other diseases of this class			1	1								47
CLASS XIV.												
Extraneous bodies.												
Corpus extraneum	1		2	1		2						134
CLASS XV.												
Poisons.												
Alcoholismus	2		19	15	1	3				2		198
Dermatitis venenata			2	2								22
Venenum neuroticum			3	1		1				1		38
Vulnus venenatum			7	7								200
Other diseases of this class			1	1								37
CLASS XVI.												
Feigned diseases.												
Dyspnœa			1	1								16
Rheumatismus acutus		1		1								10
Total	392	283	2,702	2,255	242	448	40	26	9	57	300	117,158

TABLE XIV.—*Prevalence of special diseases and injuries in the Navy and Marine Corps during the year 1899.*

[Average strength 20,113.]



Diseases.	Number of Admissions.
Malarial Diseases.	943
Diarrhœal Affections.	900
Wounds.	884
Rheumatic Affections.	716
Bronchial Affections.	685
Epidemic Catarrh.	672
Contusions.	573 ✓
Gonorrhœa. ✓	517
Sprains.	484
Syphilis, Secondary. ✓	322
Dengue.	297
Chancroids.	226 ✓
Alcoholismus.	193
Burns.	161
Fractures.	156
Heat Stroke.	154
Typhoid Fever.	134
Pneumonia.	117
Hernia.	101
Abrasions.	88
Phthisis.	87
Syphilis, Primary. ✓	84
Dysentery.	68
Luxations.	45
Heart Disease, Organic.	42
Measles.	37
Nephritis.	31
Scarlet Fever.	29
Concussions.	29
Drowning.	20
Yellow Fever.	8
Smallpox.	6

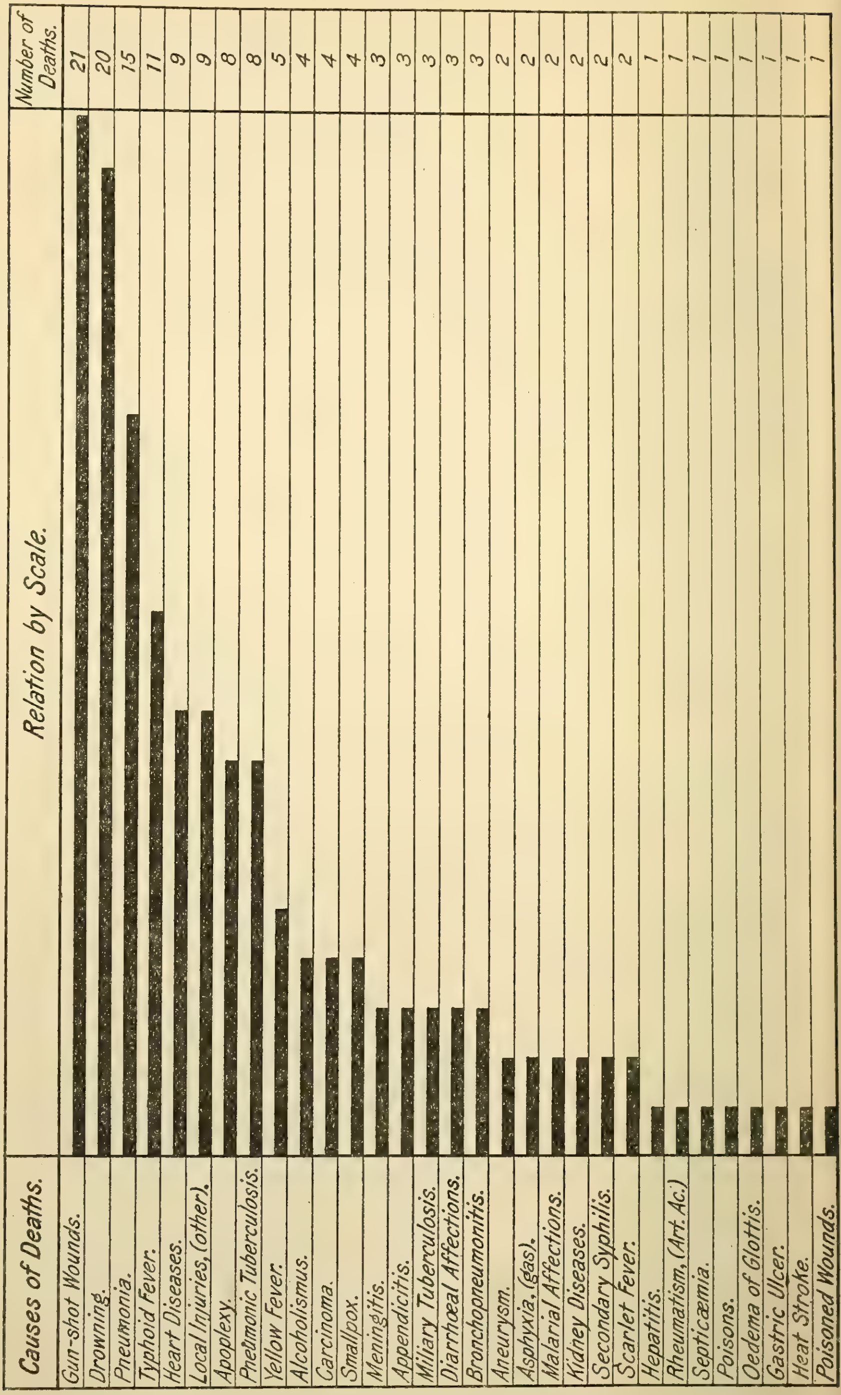
TABLE XV.—*Mortuary record of the Navy and Marine Corps for the year 1899.*

Cause of death.	Number of deaths.					Average age.
	Hospitals.	Yards and stations.	Vessels.	Elsewhere.	Total.	
Alcoholismus	2		2		4	34.58
Ambustio ex calore	1				1	22.66
Aneurysma	2				2	48.92
Apoplexia		1	2	1	4	37.53
Appendicitis	3				3	29.19
Asphyxia (coal gas, 1; bilge gas, 1)			2		2	28.45
Asphyxia ex submersione	1	4	13	2	20	26.60
Broncho-pneumonitis	2		1		3	37.27
Carcinoma	3		1		4	47.45
Catarrhus intestinalis chronicus	1			1	2	51.79
Concussio	1		1		2	48.72
Cordis valvularum morbus	3	1	4		8	40.94
Dysenteria chronica		1			1	41.33
Febris cerebro-spinalis	1	1			2	37.50
Febris enterica	3	7	1		11	33.07
Febris flava		4		1	5	25.60
Febris pneumonica	13	1	1		15	27.26
Febris remittens		1	1		2	22.79
Fractura		1	4		5	24.29
Glottidis œdema			1		1	21.17
Hemiplegia	2	2			4	43.25
Hepatitis chronica	1				1	51.18
Luxatio	1				1	17.50
Meningitis			1		1	31.00
Myocarditis			1		1	54.75
Nephritis acuta	1			1	2	52.00
Prostratio thermica			1		1	56.25
Rheumatismus articularis acutus			1		1	37.17
Scarlatina	2				2	21.91
Septicæmia		1			1	32.00
Syphilis consecutiva	2				2	35.91
Tuberculosis miliaris acuta	2		1		3	35.16
Tuberculosis pneumonica acuta	1				1	29.16
Tuberculosis pneumonica chronica	4		1	2	7	31.22
Ulcus gastricum	1				1	26.50
Variola	1		3		4	28.25
Venenum neuroticum	1				1	30.37
Vulnus sclopeticum	2	1	13	5	21	27.21
Vulnus venenatum		1			1	28.75
Total	57	27	56	13	153	35.01

Death rate in the Navy and Marine Corps per 1,000 of strength for the year 1899	7.35
From disease	4.56
From injury	2.79

TABLE XVI.—*Deaths in the Navy and Marine Corps during the year 1899.*

[Average strength, 20,819; total number of deaths, 153; ratio per 1,000 of strength, 7.35.]



Causes of Deaths.	Number of Deaths.
Gun-shot Wounds.	21
Drowning.	20
Pneumonia.	15
Typhoid Fever.	11
Heart Diseases.	9
Local Injuries, (other).	9
Apoplexy.	8
Pneumonic Tuberculosis.	8
Yellow Fever.	5
Alcoholismus.	4
Carcinoma.	4
Smallpox.	4
Meningitis.	3
Appendicitis.	3
Miliary Tuberculosis.	3
Diarrhoeal Affections.	3
Bronchopneumonitis.	3
Aneurysm.	2
Asphyxia, (gas).	2
Malarial Affections.	2
Kidney Diseases.	2
Secondary Syphilis.	2
Scarlet Fever.	2
Hepatitis.	1
Rheumatism, (Art. Ac.)	1
Septicæmia.	1
Poisons.	1
Oedema of Glottis.	1
Gastric Ulcer.	1
Heat Stroke.	1
Poisoned Wounds.	1

REPORTS ON CRUISING SHIPS.

REPORT ON THE U. S. FLAGSHIP NEW YORK.

By Paul Fitzsimons, *Medical Inspector, United States Navy.*

The cruising of the *New York* during the year extended from Bar Harbor to Trinidad, covering most of the ports on the North Atlantic Station. She was sixty-nine days at sea and two hundred and ninety-nine days in port. The total number of admissions was 385, the total sick days 3,576, and the daily percentage of sick was 1.8.

Many men are sent to the flagship during the year to take the places of those transferred and discharged. From these, 393 were vaccinated, and special attention is called to the percentage of success, viz, 36.28, and to the additional fact that 21 showed no traces of previous vaccination.

The sick bay is forward on the berth deck and has a capacity for 4 cots. The overflow swings in hammocks in the passageway aft, and it is reasonable to suppose that if the conditions surrounding the sick were improved, that the number of days on the sick list would be lessened, more especially if the sick quarters were moved to the gun deck. A small space on this deck is now used, and is a great convenience for the examination of recruits and patients and microscopical work.

The system of artificial ventilation established six years ago is defective and inadequate. It has gradually grown worse from the difficulty in overhauling the valves and conduits, from accumulations of dust and dirt, etc., and an entirely new system should be put in the ship.

Water of sufficient purity for drinking can be distilled with a pressure of only 6 pounds in the coils. At 12 pounds pressure the water goes over salt, and thus the theoretical work of the distillers has to be reduced one-half, making it difficult to keep up a proper supply of fresh water.

To avoid the necessity of buying shore water, it is strongly recommended that the distilling capacity be doubled at an early opportunity, and this can probably be done by installing another evaporator.

The system of lighting the ship as originally designed was found inadequate, and during the six years' commission many changes were made, but all of these were recently done away with, and at present much discomfort is experienced from insufficiency of light and from the impossibility of running a light and a fan at the same time.

The ship has been six years in commission without a thorough overhauling, and things that would be indifferent at this date if new, are bad from necessary wear and tear.

REPORT ON THE U. S. FLAGSHIP BROOKLYN.

By **Remus C. Persons**, *Medical Inspector, United States Navy.*

During 1899 the sanitary condition of this ship has been excellent, and there has not been any case of sickness attributable to faults in construction. While cruising under marked variations of temperature the ship has been dry, with a minimum of sweating of sides and decks. The general atmospheric condition obtaining throughout the ship has been warm and dry, in the double bottoms as elsewhere; nor has water accumulated in the bilges.

The working of the ventilating system is not, however, all that is desired. Although the fans are run at a good rate of speed, the current of air delivered through the farther exits is feeble and not of sufficient force to properly supply closed compartments. The difficulty seems to be that the fans are not of sufficient power to supply so much piping of large size with a strong current. The large open air and gun ports offset this defect in a great measure, but under conditions when it would be necessary to close them for any length of time the ineffectiveness of the fans would become more evident, in warm climates particularly.

The flushing system is so constructed that the water which has passed through the condensers to cool the steam for distilled water, and has become heated thereby, has to be forced through the wash rooms, urinals, and water-closets. This water is so hot in the firemen's wash room that it is impossible for them to use the shower baths, and having only the bowls to use, they keep clean with much difficulty. It is also so hot in running through the heads that the crew can not sit on the seats provided therein on account of the steam. I am glad to report that a change has been ordered in the arrangement of this system, so that cool water from overboard will be circulated instead. This will tend also, incidentally, to lessen the temperature within the vessel along the course of the pipes.

The health of the crew has been generally good. There has been no case of infectious disease, nor has any case arisen from insanitary causes. About a dozen men were poisoned from eating cheese, of which number six were admitted to the list, all yielding promptly to treatment. All injuries received have been of a minor character and all wounds have healed rapidly.

The condition of the cells has been sanitary, and there has not been any case wherein the health of a man in confinement has been injured.

REPORT ON THE U. S. S. PHILADELPHIA.

By **Thomas H. Streets**, *Medical Inspector, United States Navy.*

The sanitary condition of this vessel during the year just passed has been excellent and the health of the officers and crew exceptionally good. With an average complement for the year of 341, the total sick days were 1,770, the daily average of patients 4.8+, and the percentage of sick 1.42+. The total sick days include 302 sick days for the casualties received during the recent trouble at Apia, Samoa. Deduct this number and there remain 1,468 as the total sick days, the daily average of patients 4+, and the percentage of sick 1.18+.

The latter figures more correctly represent the sanitary condition of the vessel and station than the former. There were 7 deaths during the year, 6 of which were from gunshot wounds received in the Samoan Islands. Fifteen patients were transferred to hospital.

On January 31, 1899, the *Philadelphia* left San Diego, Cal., for the Samoan Islands, arriving there March 5, and remained there seventy-six days. During this long stay in a tropical port, where the relative humidity is excessive, the health of the ship's company was remarkably good. About the only evidence of the effects of the climate presented in the sick reports was an increase of intestinal and cutaneous diseases. The former were mild and easily controlled. The same remark, however, does not apply to the cutaneous diseases, which were rebellious to treatment and of long duration. It is supposed that they owed their origin largely to the multitude of flies (of the common domestic species) which exist on these islands. They swarm on the ships at anchor as well as on the shore, and they may be properly designated a plague. So great is the annoyance caused by them, to native and foreigner alike, both inside the house and without, that everyone carries a brush, like a horsetail, called the "fui," to fight them from the body. They poison all abrasions of the surface of the body. The most insignificant prick or scratch soon becomes a sluggish ulcer with raised edges and with surrounding skin thickened and infiltrated. It is my belief that the fly will be found to have a causal relation to the elephantiasis of the leg and scrotum which is so prevalent among the natives of these islands; that it is either the intermediate host or the carrier of the parasite of that disease. Leg ulcers of the kind I have described are common. It is a fact worthy to be recorded that no disease of a venereal nature was contracted during our stay at the islands. This immunity I can only attribute to the freedom of the natives from the disease.

The only other item of sanitary interest which I have to mention was the presence on board, during the last quarter, of epidemic catarrh, or influenza. Some of the cases might be called grippal pneumonia. There was pain at the base of the lung, and bloody sputum. The area involved was very limited, there being no difficulty of respiration nor embarrassment of the heart's action. The temperature in these cases was 103° F. to 104° F., and the duration of the fever from four to five days.

For a little more than five months—from July 1 until December 5—this vessel lay at the navy-yard, Mare Island, undergoing changes in her internal arrangements. Some of these changes affected the medical department of the vessel to a considerable extent. The dispensary, which was formerly on the berth deck, about midship on the port side, was converted into a mess room for the warrant officers, and a new dispensary was erected on the protective deck aft, on the port side, forward of the sick bay (Compartment D, No. 111). The new dispensary is much smaller than the old one. In one respect the change is desirable, as it brings the sick bay and dispensary close together, while under the old arrangement they were widely separated. The greatest objection to having them located in this part of the ship is their inaccessibility. It is with the greatest difficulty that a helpless person can be conveyed to the sick bay and dispensary. The only access to them, except by going through the wardroom or down the commanding officer's hatchway, is through a narrow hatchway, or scuttle, 22 by 32 inches, opening into the engineer's machine shop, and thence along a contracted passage connecting the machine shop with the passage between the store rooms aft. I desire to commend, however, the location of the sick bay for advantages to which my predecessor has already directed attention. It "is admirably situated to secure quietness and isolation for the sick." These are advantages seldom found in sick bays on our men-of-war, and to secure which ease of access may well be sacrificed.

REPORT ON THE U. S. S. BALTIMORE.

By George E. H. Harmon, *Medical Inspector, United States Navy.*

The *Baltimore* was commissioned at Mare Island October 16, 1897, and was employed on the Pacific Station, chiefly at Honolulu, until March 25, 1898, when she was ordered to the Asiatic Station.

Joining this squadron at Hongkong in April, 1898, she took part in the battle of Manila, May 1, and, with the exception of a short trip to Hongkong, has been stationed since that time in the Philippines, for the last eight months almost continuously in Manila Bay.

During the year proper of 1899 the ship was thirteen days in Hongkong, seventy-five days in Iloilo and other ports of the Philippines, and the remainder of the time in Manila Bay. The long stay in this tropical climate is beginning to tell upon the health of the ship's company.

While the officers and men still maintain good health and have been, to a surprising and unexpected degree, free from local prevailing diseases, there is an unmistakable falling off in the physical stamina, a perceptible narrowing of the margin of reserve vitality. This is exhibited in the graver character of ordinary trifling injuries and ailments. Slight abrasions are slow to heal, and, without the most careful attention, degenerate into sluggish ulcers; mild bronchial catarrhs are persistent and show a tendency to loss of tone, weak heart action, and general debility; skin eruptions become chronic; and, finally, within the last month or two a number of cases of the local "febris tropica," the "calentura" of the Philippines, have made their appearance. The health of the ship is naturally better than that of the army or of the marines stationed on shore, thanks to the less degree of exposure to paludal and climatic causes of disease, but there is no doubt that the long stay in these waters is beginning to exercise a deleterious effect upon the crew. Thus the percentage of sick for 1898 was 1.434; that for the year just completed is 2.049, while that for the fourth quarter is 2.375.

This is not a high sick rate, but it does not include the large numbers who apply for minor treatment and who are not excused from duty, amounting probably to another 2 per cent.

Should the exigencies of the service permit, it would be a great sanitary benefit to send the ship to the northern part of the station at the beginning of the rainy season, for a stay of two or three months.

Venereal diseases are the peculiar curse of the Asiatic Station. Every seaport is a focus of infection; Hongkong and Manila are among the worst ports on the station in this respect; liberty parties on shore are sure to bring back "recuerdos" of their visits. The following summary will show the recorded extent to which these diseases have prevailed on board the *Baltimore* during the past year: Gonorrhœa, 23; chancroid, 12; venereal bubo, 9; syphilis, 11. Many cases of venereal diseases are, however, concealed and treated by the victims themselves in order to avoid the possible restriction of liberty. It is quite surprising the widespread knowledge of popular remedies and dressings for these diseases among the crew of a ship, and the mail orderly is the usual channel of supplies from drug stores on shore. Injection Brou, copaiba, and sandal-oil capsules are common articles of purchase, and favorite prescriptions are carefully preserved and served out to friends in distress. Now and then a case of swelled testicle or inflamed bladder, or more frequently a subsequent stricture, will bring the sufferer to the surgeon for help, and then questions elicit the history of a self-treated gonorrhœa. The virus of syphilis appears to be much more active in these Oriental countries than in Europe and America. A greater proportion of primary ulcers are true syphilis and are followed by constitutional infection. There are under continuous treatment on board this ship at this time some 12 or 15 cases of general syphilis showing various phases of the disease from recent secondary rashes, mucous patches, etc., to advanced subperiosteal induration and later syphilodermata. A special list is kept of these cases and they are required to report at stated intervals for inspection. The importance of continued, unremitting treatment is thus impressed upon the minds of the patients, their self-interest is awakened, and their concurrence in the prolonged course of treatment secured.

The *Baltimore* has been so often described in the sanitary reports of my predecessors that any detailed description of the ship is unnecessary. The ship is spacious and high between decks, and accommodates her crew comfortably. The bilges, lower compartments, etc., are kept clean and dry. The mechanical ventilating plant is efficient—indeed, is the best that I have ever seen in any ship. Good currents of fresh air are delivered at every opening, even in the remoter parts of the ship, and there is a gratifying absence of bilge smell and ship odors.

The sick bay is situated on the after torpedo flat beneath the lower cabin, having been shifted from its former position forward on the berth deck when the ship was last commissioned at Mare Island. This has been found to be very inconvenient and unsuitable for berthing the sick in this tropical climate. It is directly over the dynamo and steering engine, and even in port, with outlets open, it is 8° to 10° warmer than the berth deck. It has no water supply, no bath tub, and is separated the whole length of the ship from the dispensary and medical storeroom. The light, too, is very deficient. The former sick bay, forward, is sadly incommoded by yeoman's storerooms, which open into it, and by the anchor chains that pass through it, but even with these drawbacks it is cooler, has water supply, bath and closet, and is adjacent to the dispensary and storerooms. Permission has been granted to restore the sick bay to its old situation, and the change is now being made.

The question of battle station and transportation of wounded in this ship is particularly difficult of solution. There is no place of safety above the protected deck, and it is entirely impracticable to go below it to establish a refuge for the wounded, as lack of light, inaccessibility, and increased difficulty in transportation of wounded in battle exclude it from consideration. The sick bay, therefore, seems to be the most convenient station, as it is quite as safe as any other part of the ship and has all the appliances and supplies close at hand.

The apparatus for transportation of wounded in use consists of cots with steel foot bars and canvas belts to secure the body, and of wooden slides fixed in the hatchways over two of the ladders leading to the berth deck. This answers the purpose as well as any mechanical device that I have seen, but I am still inclined to favor the simplest methods and to dispense with mechanical contrivances, which require some familiarity to use properly, are bulky, and have to be "stowed" when not in use. Hammocks containing mattresses are always close at hand in battle, a wounded man can be loosely secured in a hammock by a turn or two of the lashing by anybody, and one man can slide him along the deck to a hatch with, I think, less chance of injury than a stretcher offers. At the designated hatches a sheet of canvas, rather wider than a hammock, secured at the bottom of the hatch combing inside by a steel rod running through a hem in the upper end, and the corners lashed securely below to small brass eyes or ringbolts in the deck, seems to me the most satisfactory contrivance for getting wounded men below. This was the method adopted on board the *Newark* during the late Spanish war, and although we happily had no occasion to use it for wounded men, yet it worked very well experimentally. One of its chief advantages is the smaller number of men taken from the guns as aids to wounded. In this ship, in action, with two medical officers, one would remain at the central station in the sick bay while the other one would "skirmish" on deck, with his portable supply of first-aid dressings, to render service wherever needed. But with the most painstaking thought and care to provide beforehand, the surgeon will find in the short bloody battles of the future, when one shell may disable a whole gun's crew and missiles from rapid-fire guns sweep the deck like storms of hail, sufficient work without occupying his mind with "How to get his wounded below." If he can stop a hemorrhage here, put a hasty temporary support on a shattered limb there, and get the wounded men in any convenient nook or corner, away from the guns and out of the rush and turmoil of the fray until the fight is over, he will do well his duty, do all that in him lies.

REPORT ON THE U. S. FLAGSHIP IOWA.

By DAVID O. LEWIS, *Surgeon, United States Navy.*

During the time covered by this report (October 24 to December 13) the health of the crew has been excellent and the extreme cleanliness of the ship has left little to be desired from a hygienic point of view.

The sick bay is roomy and well ventilated. It is lighted by three air ports, and offers for a ship exceptional advantages for the care of the sick. Situated as it is, however, in an unprotected portion of the ship, it has been found necessary to select some other compartment for the temporary lodgment and care of the wounded in action, and the petty officers' mess room, located behind the diagonal armor, has been set apart for that purpose.

In a previous sanitary report the ventilation of the various parts of the ship has already been described, but I might add that the numerous blowers constantly in operation and opening into most of the compartments render the ship singularly free from bad odors of every sort. The rooms in the citadel are, however, somewhat imperfectly ventilated, and it is said unpleasantly hot in tropical climates. The experiment has been tried of running the blowers so as to exhaust the air from those spaces, but this resulted in an increase rather than a decrease of the temperature, and therefore the former method of forcing the air in has been resumed.

The recommendation to cut a doorway from the forward fire room into the corresponding handling room under the 12-inch turret is generally considered of doubtful utility if not altogether impracticable, owing to the construction of the vessel. Certain modifications have been made in the arrangement of pipes in the forward fire rooms, rendering this change no longer necessary.

Since the report of my predecessor an additional evaporator has been placed on the main deck in one of the drum rooms. There the ventilation is much better than in the main distiller room, which is still imperfect in that respect and altogether too hot for continuous occupancy by those on watch.

Some complaint was made at one time by the occupants of the chief machinist's quarters of an extremely offensive odor coming from the cold-storage room on the port side, the vitiated air being drawn down through a chute to their quarters below. On examination it was found that vegetables had been placed in the cold-storage room, and as the temperature there is not always sufficiently low, some decomposition had taken place. A thorough scrubbing with hot lye and subsequent washing of the sides of the room with carbolic acid and solution of permanganate of potash removed all objectionable odor. It is to be regretted, however, that the ice machine has not sufficient capacity to produce all the ice required, cool the water thoroughly in the scuttle butts, and at the same time keep the temperature of the cold-storage rooms low enough to insure perfect preservation of the meat.

The introduction of the new distiller above alluded to has materially increased the amount of water, which had been somewhat deficient. It is of excellent quality as it comes from the plant, but when pumped from the tanks it frequently has a reddish-brown tint, due to the presence of the oxide of iron, and is somewhat turbid from suspended matter of inorganic character. No symptoms have, however, resulted from its use.

The transportation of the wounded to the first-aid station in the petty officers' quarters in the citadel has been very fully and satisfactorily provided for. Each turret is supplied with broad bands of canvas, secured by a stout lashing passed through eyelet holes worked in the ends of the bands, which, being passed round the body of the patient, he can be lowered through the ammunition hoist to the handling room, where he can be placed on a stretcher for transportation, or carried by hand, as may be deemed most desirable, to the first-aid station. The removal of the seriously injured from the fire rooms may be easily accomplished by the same bands.

REPORT ON THE U. S. S. SOLACE.

By William H. Rush, *Surgeon, United States Navy.*

The duties of this ship were changed January 14, 1899, from an ambulance ship to a naval transport, to carry stores and personnel between New York and Manila, P. I. We left New York on the 2d of February, stopped in at Hampton Roads, Virginia, and finally arrived at Manila the 22d of March, stopping en route at

Valetta, Malta, Port Said, Egypt, and Colombo, Ceylon. The ship remained at Manila, where orders were received changing her route to San Francisco, Cal., until the 22d of April, and arrived at San Francisco the 27th of May, stopping en route at Guam, Ladrone Islands; Yokohama, Japan, and Honolulu, H. I.

After some minor repairs at the navy-yard, Mare Island, Cal., the *Solace* departed for Manila on the 1st of July, where she arrived 7th of August, stopping at Honolulu and Guam. She steamed out from Manila on her return trip 2d of September, and arrived in San Francisco Bay on the 7th of October, stopping in the bay of San Luis d'Apra, Guam, Ladrone Islands, and Yokohama, Japan; started on the out trip from Mare Island November 11, and arrived at Manila on the 15th of December, touching at Honolulu and Guam. The ship remained in Manila Bay until January 1, 1900.

During all this cruising the health of the crew remained excellent. On the first trip out two sporadic cases of rubeola developed about the same time in different parts of the ship, the first case being among the ward-room officers and the second in the engine-room force. Both cases were isolated and made rapid recoveries without any complications. No new cases developed. Upon the return trip from Manila many invalids were carried. The numbers were as follows: First trip, 27 to naval hospital, Mare Island; and second trip from Manila and Guam, 21 to Yokohama Naval Hospital and 29 to Mare Island Hospital. The patients improved greatly during the voyage to Mare Island with one exception, that a case of acute articular rheumatism, which for the first few days out from Manila improved somewhat, but hyperpyrexia came on and he died just after we reached Guam Island, his highest temperature being 109° F. He was buried on Guam Island. Many cases of nausea marina developed on the second trip out, there being about 350 men new to the service in the Third Marine Battalion. Some 55 men had to be seen and prescribed for daily, although their sickness was not sufficiently severe to cause their entry in the medical journal.

The general sanitary condition of the ship has been excellent. Only once was there any departure from this state, that being an accumulation of engine-room refuse in the bilges of the after hold. It was discovered, and the bilge cleansed and disinfected before any decomposition had taken place.

Some changes have been made in the medical department since her conversion into a transport, the dispensary being moved from the room just aft of the main saloon on the starboard side to the room formerly occupied by the senior assistant, this room being divided into two, one of which is now used as the dispensary and the other as the hospital steward's room. When the emergency arose the doors of the sick bay, formerly lounging room and convalescent mess room, were found too narrow to permit a stretcher with a patient upon it to be taken in. The starboard door was widened while the ship was at Mare Island, and there is no obstacle now. It was also found necessary at the time to make more water-closet room for the number of men coming in the Third Battalion of marines, so that the water-closet on the port side aft of the sick bay was torn out, the floor heavily cemented, and a head made with accommodations for seven men for the use of the crew. The two water-closets formerly on the main deck for the use of the crew were also removed and converted into a head with accommodations for seven men.

The three cells on the main deck, aft, are very poorly ventilated, and when in the tropics the temperature constantly remains at about 90° F. I have frequently seen prisoners confined dripping with perspiration although the only article of clothing on them would be a light pair of linen or cotton trousers. The cold-storage room is in an exceedingly bad situation, the cold-air pipe leading from the ice machine having to run a distance of at least 100 feet through the fire and engine rooms. It has been suggested to place it in the wings near the ice machine. In bad weather at sea, when the ports of the sick bay have to be kept closed, the atmosphere becomes very close, and from the presence of phthisical patients a possible source of infection is produced, so I have recommended that a ventilator be placed in the deck covering it.

As there was a battalion of marines on board during the last trip out the Medical Department had a good opportunity for the trial of the vaccine matter in tubes furnished. Five hundred tubes were received, of which 200 were used to vaccinate 530 persons. The balance, 300 tubes, were transferred to the fleet surgeon on the Asiatic station. The number successful was large, but the sores produced were rather severe, although no serious results followed. The tubes transferred were in good condition, which would have been improbable with the ivory points formerly furnished.

As our stay at the various ports visited, except Cavite, was very short no notes were made, and none at Manila, owing to the presence of the fleet there.

REPORT ON THE U. S. S. MASSACHUSETTS.

By James C. Byrnes, *Surgeon, United States Navy.*

The first of the year found this vessel at the yard undergoing extensive repairs, which were not completed till the end of March, 1899.

During the month of August catarrhus epidemicus appeared on board and continued at irregular intervals till October. Fifteen cases were admitted and 1 readmitted, giving a total of 103 sick days. There were a large number of cases treated without admission to the sick list.

The next largest number of admissions arose from venereal diseases. There occurred 43 cases, divided as follows: Syphilis, 6; chancroid, 3; gonorrhœa, 18; sequelæ, 16; transferred to the hospital, 21. Total number of sick days, 294. The ports of greatest infection were Philadelphia and Bar Harbor.

One death occurred from drowning in the North River, New York, of a member of the crew attached to the second steam launch belonging to this vessel. There occurred one attempt at suicide. A petty officer cut his throat while suffering from dementia. An apprentice, second class, had his neck broken (fourth cervical vertebra) from a blow received from a falling table suspended overhead on the gun deck, and died at the naval hospital, New York, thirty-seven hours after receipt of injury. There occurred a fracture of the radius of the left forearm in the case of an apprentice, second class, who was caught in the drum of a winch while coaling ship.

The commissary system of messing which had obtained in previous years of commission of this vessel was abandoned in October last. The purchase of all provisions, supplies, canned foods, meats, fruits, vegetables, milk, soaps, tobacco, smoking accessories, and small stores, not a part of the ship's allowance, were under the direct supervision of the pay department of the ship. The department was admirably conducted, but owing to great dissatisfaction existing among certain members of the crew the system was abandoned and a return to the old system of separate messes was adopted. The change is to be regretted. The advantages of the general commissariat were many. Rigid inspection of all food was followed before acceptance; contractors sustained all losses and were compelled to make them good; there was a uniformity of meals at all times, sufficient for cruising at sea and while in port, and without extra tax upon individuals. A return to the old system has resulted in a great and unequal variety of food, improvidence, especially at sea, and a varying tax upon individuals.

A brief cruise was made to the West Indies during the month of April. The vessel returned to Tompkinsville, Staten Island, New York, early in May, where she remained till the latter part of the month, when with the vessels of the North Atlantic fleet she proceeded to Newport, R. I. This point was made the rendezvous of the squadron during the summer. Numerous visits were made to Eastern ports and one to Hampton Roads, Virginia. Much time was spent in maneuvers and target practice at sea, till a final return was made to New York the latter part of September.

During the month of October this vessel was engaged with the flagship New York in experimenting with the Marconi system of wireless telegraphy at sea. Early in December the vessel was detached from the North Atlantic Squadron and assigned to special duty in conducting experiments with the Miller conveyor for coaling vessels at sea. This duty completed, the vessel returned to the navy-yard, New York, in December for repairs and to go into reserve when they are finished.

Since the first of the year all woodwork has been removed from the wardroom mess hall. In its place an inner lining of asbestus has been laid on next to the skin of the ship in panels. The change is beneficial. Besides being a nonconductor of both heat and cold, the material is easily kept clean and does not give opportunity for the lodgment of extraneous matters.

Outboard rooms on the starboard side, for the use of the commissioned officers, have been remodeled. All woodwork, except a writing desk, chiffonier, and cabinet, located over the bunks, has been removed. The inner skin of the ship's side was covered with panels of asbestus; the old fore and aft wooden bunks were removed and thwart ship folding bunks with iron frames and wire platforms have been substituted. Each berth is furnished with a pneumatic mattress, which is especially satisfactory in the tropics and during warm weather. During cold weather there were many complaints against its use, because of an inability to keep warm during the sleeping hours. This difficulty has been remedied by the use of a cotton pad covering in the entire mattress. The room occupied by the medical officer of the ship has been recently subjected to the above changes, except the lining of the ship's side with asbestus.

Additional evaporators and distillers were installed during the year, giving an increased water supply of 1,500 gallons daily.

The ventilation of the firerooms has been improved by the removal of the forced-draft blowers from a point above the fire-room gratings to uptakes placed on a level with the orlop deck. In the old situation the temperature of the space immediately surrounding the blowers reached at times 210° F., a condition in which it was impossible to control movements of blowers or to make necessary repairs while under steam. The change has brought about a reduction of temperature of over 30° F. The temperature of the fire rooms while under steam is good, except fire rooms A and B. Faulty circulation of cool air in those compartments is the result of the location overhead of the bakers' ovens, where ship's bread is baked while at sea. They cover one of the fiddleys situated immediately above the boilers, shutting out the external air supply. It is believed the condition could be remedied by lengthening the cowl ventilators now in use.

The flushing system of the men's closets has been improved by the addition of a new flushing pump. This does not, however, entirely reach the desired results. During heavy weather at sea, when overhead hatches are closed, cowl ventilator removed, and passageway opened to closets from the forward berth deck, the atmosphere in the forward connecting compartments quickly becomes contaminated with strong ammoniacal and other odors. A change of the closets from their present location to the gun-deck spaces under the two forward 8-inch turrets, where there could be no obstruction to a successful flushing and free ventilation of the troughs, urinals, and surrounding parts, is submitted for consideration. It is believed such a change would prove to be of decided benefit.

The sanitary tank connected with fire-room wash rooms gave considerable trouble during a part of the past summer from disagreeable odors arising each time the tank was emptied, also from motion of the ship while under way. Repeated disinfection, cleaning, and painting of the interior of the tank had but little effect in remedying the evil. When in use the tank is now constantly flushed and emptied at the same time. The change arising therefrom has proved to be a marked improvement. A change in the location of the wash rooms from their present site to the compartment now occupied by the men's closets, where bowls could drain directly overboard, and not be dependent upon the pumping system, as it now is, would prove to be of the greatest sanitary value.

The ventilating system of the ship has been thoroughly overhauled and is now very satisfactory. The efficiency of the cold-storage rooms was greatly increased by the introduction of cut-out valves. Heretofore the discharge pipes of each space have been constantly in use whether needed or not. The change has brought about a concentration of cold air only in the room or rooms actually in use.

Very important changes are about to take place in the location of the water-closets assigned for officers' use. They are to be moved from the present location on the berth deck and are to be placed in the spaces under the two after 8-inch turrets located on the gun deck. The space arising from the removal of the closets is to be converted into sleeping rooms, mess hall, and pantry for the use of the warrant officers. Numerous other changes are to be made, especially in the junior officers' quarters. The executive officer's and paymaster's offices are to be moved to another part of the ship for increased space.

After the completion of the repairs and changes recommended, it is ordered that this vessel go into reserve at the navy-yard, League Island, Philadelphia, Pa.

During the year the sanitary condition of the ship on the whole has been excellent.

REPORT ON THE U. S. S. NEWARK.

By Averley C. H. Russell, *Surgeon, United States Navy.*

From January 1 to March 23 the *Newark* was at the navy-yard, New York, undergoing repairs. During that period the weather was, on the whole, very inclement. A blizzard occurred the first week in February. Two small steam coils, one in the bathroom and one in the sick bay, furnish heat for the sick quarters, the sides of which are of sheet iron unlined with wood. The temperature in the sick bay during the very cold weather of February could not be raised above 48° F. Cases of tonsilitis and catarrhus epidemicus were constantly developing. On account of the low temperature of the sick bay, it was necessary to send to the hospital a large number of these and other cases. The hospital steward had scarlet fever the first week in February. He was promptly removed from the ship, and the sick bay was fumigated with formaldehyde gas. No other cases developed.

The ship joined the North Atlantic Squadron at Kingston, Jamaica, March 30, and cruised with the squadron till April 20, on which date she sailed for the Pacific Station. In the warm and equable weather of the Tropics a few cases of tonsilitis and grippe still occurred. One day was spent at Rio de Janeiro. Communication with the shore was avoided. No one went ashore, and no one came on board. The ship was quarantined, however, at Flores Island, Montevideo. All ships coming to Montevideo from Rio during the yellow-fever season are quarantined by the Uruguayan Government. All the bedding of the crew and of the officers was baked at Flores Island. The berth deck was scrubbed with a solution of bichloride of mercury. There were no cases of tonsilitis and catarrhus epidemicus afterwards, and the health of the crew was excellent until the ship reached Valparaiso, June 24.

During the stay of the ship at Port Low, Guacanec Island, the crew were much exposed to cold and rain, cutting wood on the boggy islands. They were often wet through for hours. There was no steam to heat the ship the first ten days. There was practically no sickness. One man was accidentally shot through the soft parts of the right thigh with a .22-caliber rifle. The wound healed readily.

General liberty was given during the twelve days' stay the ship made at Valparaiso. One case of febris enterica and 44 cases of venereal disease resulted.

Two weeks were spent at Callao, Peru. Febris enterica was epidemic in Lima. The disease was contracted by one of the junior officers who had occasion to visit Lima frequently. Two cases of appendicitis occurred at Callao.

The ship left Callao, August 9, touched at San Jose de Guatemala and Acapulco, and reached San Francisco, August 29. She sailed from San Francisco for Manila, October 18, via Honolulu and Guam, and reached Cavite, P. I., November 25.

General liberty was granted at Honolulu. Two cases of febris enterica and a number of cases of venereal disease resulted. One of the cases of febris enterica developed secondary syphilis during convalescence. The initial lesion was contracted in San Francisco, but was so trivial that it escaped the patient's notice.

After one week spent at Cavite the ship went to Lingayan Bay, off Vigan, Luzon.

A landing party of 120 men and 3 officers went to Vigan, about 4 miles from the coast, the afternoon of the day of our arrival, December 5. Another party of 100 men went to Vigan the next day. Two cases of smallpox were found among the sick soldiers at Vigan. Those among our landing party who were thought to be unprotected were vaccinated. No cases developed among the ship's company. There were no casualties. Food and distilled water from the ship were used by the landing party. All shore water used was boiled.

The ship reached Aparri, Luzon, December 10. A squad of marines went ashore December 11 and were joined by others from the U. S. S. *Helena*. They occupied the barracks of the Filipino soldiers who surrendered that day. The barracks had been the house of the Spanish friars before they were carried away as prisoners by the Filipinos. It is a two-story building, with large, high rooms. It adjoins the church and faces the plaza of the town. The floors of the rooms were sprinkled with chloride of lime and swept before the marines were allowed to occupy them. At one side of the second story of the building two rooms had served as water-closets for the friars and the soldiers. Through holes in the floor the feces and urine fell to the ground along the outside of the lower story. Chloride of lime was sprinkled on the floors and the doors were sealed. The accumulations on the ground below were covered with chloride of lime and then buried in sand. A covered latrine was dug in the back yard. This was disinfected every morning with chloride of lime and the dejections were covered with sand. Distilled water was used for cooking and drinking. No cases of sickness worth noting occurred.

Aparri, a town of between 8,000 and 10,000 inhabitants, is situated at the mouth of the Rio Grande de Cagayan, on the right bank. It is separated from the sea by a broad beach of sand and sand dunes. Its site is low and marshy. At low tide long stretches of mud are uncovered. Most of the houses are built on posts so that the lower floors are from 2 to 3 feet from the ground. The walls of the lower story of some of the houses are of stone or concrete, but the inhabitants live in the second stories. Some of the business houses are built entirely of brick and roofed with corrugated iron. A hole in the floor of some room in the houses answers as a water-closet. The dejections fall to the ground below and are washed by the rains into the shallow wells. These water-closets usually adjoin the kitchens. The houses of the poorer classes are built of bamboo and thatched with cocoanut palm leaves. The better classes drink rain water; the poorer classes drink the water of shallow wells. The surface of the water in these wells is only 3 or 4 feet from the curb and is often covered with a green mold. The soil is very porous and the filth from the streets and the yards percolates into the wells. Hogs, cows, horses, goats, and numberless dogs roam the streets at all times.

The prevailing diseases are malarial fevers, typhoid fever, especially in the rainy season, diarrhea, dysentery, beriberi, and smallpox. Intestinal parasites are very prevalent. The town has a large drug store, but no graduate physician. The only doctor is an undergraduate. He has a private hospital, the only approach to anything that could be so named in the town. This consists of one long room in a one-story native building. It contains six wretched bamboo cots, one table, one chair, and a cupboard in which a few drugs are kept. The doctor had for his assistant a practicante, a sort of hospital steward, who had received some training in the Spanish army.

A landing party of 95 went on the 14th of December to Pamplona, a small town near the seacoast about 12 miles to the west of Aparri, and remained there two weeks. Provisions and distilled water were sent to the party from the ship. One case of dysentery occurred. The other illnesses were trivial. The climate of the north coast of Luzon is delightful during December and January. There is scarcely any rain, and the nights are cool enough to require a thin blanket.

REPORT ON THE U. S. TRAINING SHIP LANCASTER.

By James D. Gatewood, *Surgeon, United States Navy.*

Nothing of value to the service at large or to the crew would result from such a detailed or even general description of this ship as is commonly found in sanitary reports. The type of vessel places her outside the circle of interest, and the sanitary problems involved were argued and reargued when wooden ships dominated the sea. Many years of service as a cruiser have afforded opportunities for as many reports, and it is not believed that there can be any information incident to the vessel as a type that is not already in the possession of the Department. She is simply the old wooden gun-decked man-of-war with auxiliary steam power, a modern battery, electric lights, and apparatus designed for the artificial ventilation of lower deck and storerooms.

The system of artificial ventilation consists of two Sturtevant blowers—one on either side of the forward berth deck and each with an engine of one cylinder 7 by 6 inches. The engines are of obsolete pattern, and the one on the starboard side has, by reason of cracks in the cylinder, been out of commission during the entire cruise in the Tropics. The port engine has been run at only 150 revolutions on account of its worn condition and of the reduced pressure in boiler. The conduits are under the deck and give offshoots to the berth deck, officers' staterooms, and the storerooms. There should be a connection with the prisons, where the air becomes offensive and overheated. The blowers are designed to draw or discharge air from two shafts covered with cowls on the spar deck. A cowl interferes with the movement of air, and the work of the blowers would be improved if regular ventilators that could be turned to or from the wind were substituted.

Space is devoted to a description of the system of artificial ventilation because it is important for the apparatus to be made efficient. The ship has been cruising much of the time in the Tropics and probably will continue to do so. There have been nearly 450 men on board for some months, and the lack of ventilation on the lower deck not only causes discomfort and a lowered vitality, but will facilitate the spread of infection should the crew be exposed. While the life of the ship may not extend over another decade, it is believed that the expense involved would be more than justified by the need.

It may be of consequence to call attention to the storage of water on this ship. The upper surfaces of the twelve tanks, each with its manhole plate, form most of the floor of the hold. The plates are retained in position by gravity and are therefore readily displaced when coils of rope and other stores in that part of the ship are dragged over them. In cleaning the tanks rope-yarns have not infrequently been found. It is believed that if such coarse material can gain access, smaller and perhaps more deleterious matter, carried for instance on the shoes of those visiting the hold, could do so more readily. As more or less water is obtained for distribution by using a hand pump passed into the tanks, the chances of contamination are increased. The coverings of all openings should be dust proof, and such a construction secured that water could be distributed without chance of contamination. The amount of water received daily from the distilling plant seems to be only 1,200 gallons. In the Tropics the supply is less than it should be for over 400 persons.

The water-closet facilities for the crew are very inadequate, as there are only 8 seats in all, or about 1 seat for every 52 men. The degree of inconvenience and discomfort and the relation to the health of the crew become apparent without additional statement.

Apart from the ship, there are certain considerations relating to the crew that may properly have place in a sanitary report. The *Lancaster* has been for some months engaged in the specific duty of training landsmen. While the percentage of sickness is higher among new recruits, it is commonly believed that the increase bears some relation to the degree of discontent. During the first months of enlistment there is a tendency to magnify slight ailments or defects, and at times mental depression tends to aggravate, if not produce, disease. It is true that the change from civil to naval life, with its necessary restrictions and new environment, must be attended with more or less discomfort, but it is submitted that not a small part of the dissatisfaction is avoidable. A man entering the service becomes immediately indebted to the Government for the value of his outfit, equivalent to nearly three months' pay. For that period he can not, under the regulations, be allowed liberty and he therefore practically finds himself in prison. To one the idea of desertion becomes familiar, and to another comes the hope of a transfer to hospital on account of a defect he endeavors to magnify.

There are many reasons why a recruit should be allowed his outfit, for the lack of money affects his welfare in many ways. Not the least of these is the relation to the question of food. No men long in the Navy depend solely upon the regulation ration. Whatever may be the scientific relations of the navy ration it does not satisfy, and the amount that is utilized is not sufficient by itself to prevent the craving for additional food. Undoubtedly not a little of the dissatisfaction can be traced to the fact that the cooks are unskilled, as it has not yet been regarded as essential in the Navy to train men for that very important duty. But much of the discontent has its source in the ration itself.

It does not seem to be generally recognized in the service that the ration is much overvalued. It seems fair to state that while it is issued at a value of 30 cents its actual cost is now only about 18. As a result, when a ration is commuted the money not only secures a necessary additional variety and a better relation of nutritive substances, but adds largely to the calories, thus producing a distinct gain from a scientific point of view. Yet, even with that increase, messes composed of men long in the service find it necessary to add to the fund secured by the commutation of 25 per cent of the rations. The amount contributed by each member varies in different messes from $2 to $5 a month.

From the recognized necessity for the commutation of a certain proportion of the rations and from the voluntary contributions of money on the part of men for the purchase of still more food and greater variety, deficiencies in the navy ration can be assumed. But the deficiency is rather an illustration of the difference between theory and practice than one easily demonstrable by calculations. The navy ration has much the character of an emergency ration and should be so regarded, being composed of substances that will keep long in store. It is not likely that men can continue to utilize it to advantage. It lacks variety and, what is more, the presentation of the nutritive substances in a form to be assimilated. It lacks bulk when divided into three meals, and sufficient allowance was not made for waste in cooking and unskillful handling. For ordinary labor it is while in store theoretically sufficient, in practice it is insufficient. It costs 18 cents and is issued at 30. With a good baker and better facilities, in the form of an oven of proper size for baking bread, and with a readjustment of the ration, increasing its actual money value 50 per cent, much greater satisfaction could, however, be anticipated.

To the new recruit in debt for three months the question of food seems a hopeless one, and his discontent is naturally exceedingly great. For all such men a general mess is formed, but the members being without money can not contribute to its improvement. On this ship, where they remain only five or six months, the chance for improvement is small, and as a workingman rightfully regards the question of food as of supreme importance, the impression produced by naval life is, during that period, very detrimental to the interests of the service. It is true that some advantage is gained by the commutation of the maximum number of rations permitted by regulations, as the money thus secured can be utilized to purchase from the ship's stores at sea, where a market is not available, thus obtaining the full ration and a saving of 3 cents a day per man. But the amount thus secured is very small and does little to redeem the situation.

When a large number of such men join a ship about to sail, as was the case when this vessel started on a cruise of six months in the Tropics, there is no fund from which additional supplies can be purchased. There is also no way under the regulations by which such a fund can be created at a more rapid rate than 3 cents a day per man unless more of the commuted rations be retained and the men be placed on a diminished allowance. Much would be obtained by commuting all rations in their case, as then the regular ration could be purchased from the ship, when necessary, at a saving of 12 cents a day per man, and the extra money, increased as might be advisable in port, could be utilized whenever a market was available, or even to increase the present ration. In that way the situation could be much improved, and without some such expedient, in default of legislation giving each man his original outfit, and even in connection with it, the system of training landsmen will be unsatisfactory to the men and far from productive of the best results. In this connection it may also be stated that the supply of fresh fruits usually secured from bumboats is also beyond the reach of the new recruit unless he surreptitiously barters a part of his outfit. The temptation to avail himself of such an opportunity is, under the circumstances, urgent. Indulgence prolongs the debt period.

Another aspect of the lack of money in relation to the health of the new recruit is found in the question of rain clothes. Such clothes do not now form part of the regular outfit, as it appears there was considerable loss through their deterioration in the storerooms; but men having money generally purchase them on shore. The recruit, however, has to go for several months without protection in wet weather at sea when on watch. The direct bearing on the health of men thus exposed is apparent, and the expense to the Government of a single case invalided is obvious.

The following ports were visited during the year: Port Royal, S. C.; Hampton Roads, Virginia; Newport, R. I.; Boston, Mass.; New Bedford, Mass.; Greenport, N. Y.; Vineyard Haven, Mass.; New York, N. Y.; St. Thomas, West Indies; St. Christopher, West Indies; Pointe à Pitre, Guadeloupe; Fort de France, Martinique; Port Castries, St. Lucia; Kingstown, St. Vincent; Bridgetown, Barbados; Port Spain, Trinidad; Fredericksted, Santa Cruz; San Juan, Porto Rico.

The ship sailed from New York on October 10 and arrived at St. Thomas on October 27. The heat was excessive, and remained so during the cruise in the West Indies until nearly Christmas. The condition was such that during most of that period boat drill was regarded as impracticable. While it is desirable for a training ship to avoid cold weather, it is submitted that October is too early in the year to begin a winter's cruise in the West Indies.

Charlotte Amalia, the port of St. Thomas, has a mortality of about 32 per 1,000. The deaths exceed the births. Poverty is probably responsible for the tendency to death, as the people, poorly nourished, succumb readily to disease. The chief causes of deaths are intestinal diseases, tuberculosis, and malarial fever. Prostitutes are registered and inspected, but the system, as in other places, is only partially successful. There is a small military hospital, with twelve beds. Foreign sailors are admitted at $1 a day, with extra charges for medical attendance. There is no resident physician. At the quarantine station there is quite a good building, with accommodations for 20, and also apparatus for disinfecting clothing by steam. In the city rain water collected in cisterns is used, and such water is supplied to ships. Typhoid fever is rare.

At Basse Terre, St. Kitts, the births, as in all the English West Indies, exceed the deaths. The death rate is stated to be 27 per 1,000. Stillbirths constitute about 11 per cent of the total deaths. Diarrhea and dysentry are the chief causes of death, and tuberculosis ranks next. Malarial fevers are prevalent. Out of 969 cases admitted to hospital in 1898, 164 were of syphilis. The number of illegitimate births is double the legitimate. The city is badly built, and in the quarter where the poorer people live the houses are crowded together in "yards" without regular lanes or alleys. The houses of the negroes are much overcrowded. Water is piped into the city from a reservoir supplied by a mountain stream. The quality is stated to be good. Typhoid fever is rare. The city hospital consists of a number of wooden cottages in a single inclosure. The beds number 130. Seamen are admitted at 2 shillings a day. The quarantine station can accommodate about 20.

At Pointe à Pitre, Guadaloupe, the deaths exceed the births. The malarial influence on the island is very strong, and the military surgeon on duty in the city stated that malarial fever is the chief cause of deaths among adults, and that the form is as intense as at Tonquin and Madagascar. It affects more disastrously the negroes and native born and prevails most extensively in November, December, and January. Malarial hæmaturia is common. Tuberculosis is very common and is a chief cause of death. The course is rapid. It manifests itself in the cooler months and the native born are the chief victims. The source of the water supply is a mountain stream. The quality is stated to be good, but the supply is inadequate. From houses that can pay 4 francs a month the fecal matter is removed daily by cart; but in the case of the poor the refuse is thrown into the gutter, where a flow of water is trusted to carry it to the harbor. Typhoid and typhomalarial fevers are not uncommon. The military hospital is a part of the two-storied stuccoed building used also as a barrack. It has 65 beds. The upper floor is set apart for officers. Four sisters of charity act as nurses. Of the 120 soldiers, 18 were in hospital.

The movement of disease in the island of Martinique is much the same as in that of Guadeloupe. Malarial fever and tuberculosis are common. There is a sanatorium for the troops in the hills where two or three companies are kept at a time. The city of Fort de France is on low ground. It has a good water supply, but typhoid fever is common. Probably that is due to the method of dealing with fecal matter, which is the same as that in vogue at Pointe à Pitre. The military hospital is just beyond the city. It consists of four two-story buildings, some wooden and others stucco. The beds number 185. The grounds are ample, but poorly kept. The situation of the hospital is not good, as the site is too low.

The harbor of Castries, St. Lucia, is surrounded by high hills which shut off the wind. The heat was oppressive, and as the town is built on made ground and the harbor water is stagnant and discolored, the idea of an incubator for the cultivation of bacteria is suggested. The troops all live on the heights, and in connection with the extensive fortifications, now nearly completed, a large military hospital is being erected. The town is well supplied with water, of which the following is an analysis:

	Grains per gallon.
Ammonia, free	.0084
Ammonia, albuminoid	.0042
Nitrates	.1533
Chlorine	2.7510
Oxygen consumed in 15 minutes	.0305
Oxygen consumed in 4 hours	.0652
Total solids	11.90
Reaction	Neutral.
Color	Pale yellowish green.
Odor	Normal.

The point regarded by the chemist as unusual in the analytical result is the high free ammonia compared with the amount of other nitrogenous constituents. He, however, considered the water pure, quite wholesome, and fit for drinking purposes. Great care is exercised to prevent its contamination. Its source is the drainage of woodland, and during rains the water is excluded from the reservoir. Malarial fevers are common, the intermittent being, however, most common. Elephantiasis is infrequent, as it seems there are not more than 70 cases on the island in a population of over 47,000. From this it might be presumed that the filaria nocturna is not very prevalent. Dr. Galgey, colonial assistant surgeon at Castries, has undertaken some investigations in that direction. He found the filaria Demarquay in numbers, and, after much search, discovered what he considers a small variety of the filaria nocturna endemic in St. Lucia, and apparently similar to the filaria in the Tonga and Friendly Islands, where elephantiasis is very prevalent, though invariably much smaller than the filaria nocturna in Barbados and other places. He also seemed to think it not unlikely that the filaria has a causative relation in the cases of large sloughing ulcers prevalent on the island. The number of vessels visiting Castries has greatly increased in the last few years, and this may, in a measure, account for the prevalence of venereal affections.

At Bridgetown, Barbados, about 10 per cent of the troops are constantly in hospital. The chief cause of transfer to hospital is venereal disease. The city enjoys a reputation for healthfulness and is resorted to as a nearby sanatorium.

The West Indian ports are so frequently visited by our ships that it is not intended here to indulge in a detailed description of places already well known. In a general way, however, it may be said that venereal diseases are very common where there is much shipping, and that on all the islands the class seeking companionship with the enlisted man has, on account of differences of race and other characteristics, an unusually demoralizing influence. These circumstances, associated with the malarial and other tendencies in many places and the dearth of amusement after nightfall, induce the belief that the measure of happiness and health of a ship's company in the Tropics is increased by limiting liberty to 6 p. m. and granting it frequently. As a general rule, it would seem best for wooden ships long in service to avoid Cuban ports. It is true that during certain months the chance of infection may be more or less remote, but should such a vessel once become infected her usefulness would probably be at an end. In view of the general nature of the cruise of a training ship, it is submitted whether it is desirable to select localities where she is known to be exposed in any degree to such an influence.

REPORT ON THE U. S. S. MICHIGAN.

By Oliver Diehl, *Surgeon, United States Navy.*

The ship was taken out of winter quarters during the last week of May and started on her summer cruise on July 1, 1899. At Put in Bay, Ohio, about a week was spent in drilling the naval militia of that State, encamped on the island, detachments being taken aboard for target practice and other drills.

The ship next went to Detroit, Mich., from which port she steamed in company with the U. S. S. *Yantic*, having on board the Michigan State Naval Militia, to Mackinac Island, where similar drills were had.

The naval militia of the State of Illinois, encamped near Waukegan, Ill., were next drilled.

The rest of the season was spent in survey work on the upper end of Lake Michigan, interrupted by a second visit to Waukegan to attend the unveilng of a monument, and a visit to Chicago to attend the "fall festival."

The ship returned to Erie and was put into winter quarters in November.

During the drills of the naval militia the medical officers, hospital stewards, and apprentices, attached to the different batallions, came on board and were instructed in their duties and stations during general and fire quarters, in the routine methods of keeping medical journal, making reports, sanitary inspections, in "first aid," and in fact in all duties of the medical and hospital corps aboard ship. They displayed much interest and zeal in the work, and expressed gratification for the opportunities afforded. The medical officers of the *Yantic* belonging to the Michigan Naval Militia had served on board ship during the Spanish war, and were naturally quite familiar with the routine duties of a naval medical officer.

The members of the different hospital corps are all either practicing physicians, dentists, or pharmacists and are thoroughly fitted to perform their several duties after they are once familiar with naval routine.

HEALTH.

The general health of the personnel has been excellent. There were 59 admissions and 449 sick days during the year. The cases were mostly trivial and due to atmospheric influences. All returned to duty except 2—a case of valvular heart disease and 1 case of epilepsy invalided from the service. Owing to lack of proper facilities on board, and for the purpose of isolation, 4 cases were transferred to hospitals, 3 to the Hamot Hospital at Erie, and 1 to the Marine Hospital at Chicago.

SANITARY CONDITIONS OF THE SHIP AND STATIONS.

As the ship is tied up during the closure of navigation the sanitary conditions vary. While cruising the crew is somewhat crowded for lack of berthing space, the heads are badly located (in close proximity to the galley and fresh-provision store rooms) and the one used by the crew too small for comfortable accommodation. The absence of an electric plant necessitates the use of oil lamps and candles. But if it is the intention to replace the *Michigan* by a modern gunboat, these and other defects need not be dwelt upon, and the vessel will undoubtedly be of a modern design, with proper accommodation for the sick and with a view to better sanitary conditions.

During the winter the ship is laid up in a basin, separated from Presque Isle Bay by a dock, containing a small park, a warehouse, and other buildings. The ship is housed over, heated from a steam plant on the dock, lighted by electric current obtained from the city of Erie, and is snug and comfortable.

That portion of the dock used by the Government, known as the reservation, is rented from private individuals.

The frame warehouse has been standing for many years and is used for storing boats, etc., not used while the ship is laid up.

The other two buildings are also wooden, one, one story, the other, two stories in height. The former contains a wash room with 2 bath tubs for the crew, a blacksmith shop, and a boiler house. The latter contains a carpenter shop on the first floor; and on the second, the medical officer's office, library and reading room, and an office used as a record room.

In the medical officer's office the examinations of recruits are made, sick call is held, and prescriptions are compounded. It is, however, small for the purpose. For proper examination of recruits sufficient space is necessary for testing vision and for free movement of the recruit and examiner. It is also noisy on account of the carpenter shop beneath and the passing to and from the reading room of the crew. This building is flimsily constructed, only partially lined, and containing cracks admitting the cold air. During very cold weather a large amount of heat is lost from this cause and the examining room can not be sufficiently heated for the examination of a nude person.

While in winter quarters the ship's head is not used by the crew. Owing to its location and the fact that the ship is roofed over its use would become offensive. Instead, the crew use a small building, adjoining the warehouse, and built over the slip connected with the basin. This outhouse has 2 urinals and a seat with 4 holes opening directly into the outer air. It is unheated and very cold in the winter. To reach it the crew have to walk a distance of about 50 yards through the open air, and with a temperature as low as zero, which frequently happens, the tendency among the crew is to neglect this function. There is not always sufficient depth of water to cover the refuse nor sufficient current to carry it away. This, with the general stagnation of the water in the basin, might readily become a source of disease. Fortunately, by the time the ship goes into winter quarters the weather is sufficiently cold to counteract this evil influence. If however the ship should remain here during the summer, as happened in 1898, disease would be apt to follow. In fact, several cases of enteric fever occurring aboard in the fall of that year, were probably due to this cause.

The small park, which is inclosed and well sodded, serves a useful purpose for washing and drying clothes and as a drill ground. If larger it would answer the latter purpose better and also serve as a recreation ground for athletic games, etc.

RECOMMENDATIONS.

As the dock is not owned by the Government, and its permanent occupancy and use uncertain, recommendations in the direction of sanitary improvement may be superfluous. But if a naval station is necessary, it is important that its buildings and surroundings, as well as the ship itself, should be constructed and arranged with a view to good sanitary conditions. And the station should have proper facilities for examination of recruits, including bathing facilities.

A number of applicants for enlistment have appeared, but owing to the lack of facilities here have been directed to obtain a bath and return. They have failed to do so, perhaps from lack of means, perhaps from resentment at this requirement. If a bath tub were on the spot they would more readily accede. And as many of these men have been homeless and wandering about the country it is not considered fair to the crew to subject them to the risk of vermin or perhaps contagious diseases by allowing the use of their bath tubs.

The construction of a new building or buildings, substantially built, with a proper room for recruiting purposes having connected with it a bath tub or shower bath, rooms for dispensing purposes, for library and for necessary offices, and with modern indoor water-closets, all properly heated and lighted, would be in the direction of increased comfort and good health. This general idea could be amplified by adding a hospital ward, thus obviating the necessity of transference to a private hospital.

RECRUITING.

During the year 101 applicants were examined, 73 were accepted and 28 rejected, 5 for color-blindness.

REPORT ON THE U. S. S. MONADNOCK.

By OLIVER D. NORTON, *Surgeon, United States Navy.*

The sanitary condition of this ship, except for the high temperature, is excellent. Ships of this type are exceedingly hot while in tropical waters, and as the wardroom and rooms are directly over the boilers and fire rooms, and the cabin over the starboard engine, and as it is necessary to keep two of the four boilers in use to run the auxiliary machinery, the heat in these living quarters is high and constant.

The sensation on entering the wardroom is similar to that on entering a Turkish bath, and the deck of the rooms and wardroom is hot to the touch. The temperature in the wardroom averages about 93° F. to 98° F., and it has been stationary at 100° F. at noon under the open hatch ($3\frac{3}{4}$ by $4\frac{3}{4}$ feet) over the wardroom table, with a large horizontal electric fan working in this hatch, and two fans about 20 feet off, forcing the air to a common center under the hatch.

The only entrance to the wardroom from forward is on the port side, and this opens into a thwartship passage that leads out to the deck outside the superstructure just aft of the forward turret. Two feet from the door that leads into the wardroom, and on the port side, is the officers' water-closet, with 3 urinals; 9 feet from the wardroom door, and directly facing it, is the men's water-closet (port), with its 5 seats and a small and very inaccessible urinal trough.

As the ship heads to the wind there is almost always a current of air coming in through the thwartship passage and air ports of the officers' and men's closets. This current of air comes directly into the wardroom, and under ordinary circumstances would be most refreshing, but for the fact that it is impregnated with closet odors and ammoniacal effluvia, notwithstanding the cleanliness of these closets.

I can suggest no way to remedy this unless it be to adopt the old-fashioned monitor overhang closet, which from a sanitary standpoint would be far preferable to this internal flushing system type. The latter could be used when at sea.

But for the exigencies of the service, which seem to demand the presence of the *Monadnock* in tropical waters, I would strongly recommend, for the sake of those on board, that she be stationed in a more northerly climate.

I am inclined to believe that life on board this ship develops and aggravates a neurasthenic condition. Subacute articular rheumatism is also quite common.

The men's quarters in the forward and after compartment of the forward berth deck are comparatively cool and comfortable. The turrets of the ship act as excellent ventilators.

REPORT ON THE U. S. S. MONTEREY.

By ISAAC W. KITE, *Surgeon, United States Navy.*

During the past year this ship has been in Manila Bay, with the exception of about eighteen days, when she went to Hongkong to be docked, and of six days' absence with an expedition to Subig Bay, being for the year 358 days in port and seven days at sea. The sanitary condition of the ship has been very good, and she has had a small sick list, notwithstanding the unfitness of vessels of this class for duty in tropical climates.

I attribute to a very great extent this absence of large sick lists to the fact that the ship has done practically no cruising, but has been at anchor, and the crew most of the time on deck in the open air, sleeping on deck also, when not prevented by rain. Had the ship done much cruising, I believe the sick list would have been much larger, for when at sea all ventilators in the deck have to be removed and the ports tightly closed, as the deck is constantly wet even in the smoothest sea. All natural ventilation being thus cut off, the dependence for air is on the two blowers (Sturtevant), with which the ship is furnished, but the capacity of these blowers is not sufficient to keep the air below decks in good condition. As the ship is supplied with the single-tube system of air ducts connecting with the blowers, there can not be the proper renewal or exhaust of air when at sea.

It has been demonstrated by experiment that on this ship more satisfactory results are obtained by blowing air into the ship (plenum) than by the exhaust process. In either case when at sea the air below decks is very close and the temperature high. Nevertheless, the men have to sleep below, as there is no place above where they can escape the wash from the sea except on top of the superstructure, and only a small number can stow themselves there. At sea in rough weather this vessel is about as miserable a habitation as can be imagined, and in this port during the rainy season conditions were almost as bad as when at sea. In fair weather in port, with all ventilators open and electric fans running, one can be fairly comfortable below decks. Vessels of this class are of course unsuited for cruising, especially in the Tropics, and fortunately for the health and comfort of officers and men attached to her, this ship has been used as a station ship for the Cavite naval station during the greater portion of the year, and consequently was not employed as a cruising ship.

The *Monterey* has up to this time escaped all epidemic diseases, though smallpox was quite prevalent on shore during the first half of the year. By strict attention to vaccination, and on account of there being no liberty allowed to the men, as affairs on shore were in such a turbulent condition, the disease was avoided. Saigon virus is used on this ship and gives good results. A large number of cases of beriberi occurred among the Filipino prisoners confined in the old Spanish fortress just outside the Cavite Navy-Yard, but the disease was confined to them.

During the year 1899 there were 133 cases of diseases and injuries treated on this vessel. Of these 4 remained from the previous year, 125 cases were admitted, and 4 cases readmitted during the year. Of the total, 112 were discharged to duty, 20 to hospital, and 1 died (drowned). Total sick days for the year, 975; daily average, 2.67+.

The case of death by drowning was involved in some obscurity, being that of a man who mysteriously disappeared from the steam launch one night, and no trace of him or his remains was ever discovered afterwards. The case is detailed in the statistical report for the fourth quarter, 1899.

There have been no cases of special interest treated, and the admissions show only such diseases and injuries as might be expected on board ship. Venereal diseases, as is usually the case, contributed a very large per cent of the total sick days. Of the 975 days for the year, 358, or over 36 per cent, were from that cause. Even this large per cent will doubtless be much increased when liberty for the men on shore becomes more general.

The *Monterey* has been in action several times while in this bay, shelling the insurgents on shore, and was in action continuously for about four hours while in Subig Bay, clearing the beach of insurgents preparatory to the landing of a naval force from other vessels. No casualties occurred on board, though men and officers suffered very much from the heat.

The average temperature on the berth deck for the year was 89+° F., with hatches and ventilators open. In action, with these closed, it is very much higher, of course.

There are some defects in the ventilating system of this vessel which have been pointed out in former sanitary reports, especially in regard to that of the dynamo and engine rooms. I made several recommendations to the commanding officer concerning improvement of the ventilation of the dynamo room, and they were carried out as far as possible under present conditions. It would require radical measures to make much improvement in the ventilation and temperature of either the dynamo or engine room, as such measures would necessitate changes in the construction of these spaces (and the offices of a naval constructor besides.)

As long, however, as this vessel is used for the purposes for which vessels of this kind are intended, namely, for defense of harbors, the defects alluded to lose much of their importance. Vessels of this kind must be uncomfortable at sea from their general nature of construction, and it is next to impossible to make them comfortable or to have as thorough ventilation as desired when they are used for cruising purposes, as no amount of alteration would change the character of them. Speaking generally, duty here is most trying on the health of officers and men.

Prolonged tours of duty, under such climatic conditions as exist in the Philippines, must leave an impression on the general health, which, in many instances, may not be removed by release of duty. If the ships on duty here are to be kept as closely confined to the islands as they have been for the past year, the officers should, in my opinion, be relieved every eighteen months and allowed to finish their cruise in a cooler climate, and the men be relieved every two years. Or, if this is impracticable, the ships on duty here should be sent north regularly every six months, and be allowed to spend at least a month in a cool climate before returning to these islands.

REPORT ON THE U. S. S. MONOCACY.

By Corbin J. Decker, *Surgeon, United States Navy.*

The sanitary condition of this ship is practically the same as in former years. The last quarter of 1899 shows an increased number of sick days in the report, and in addition there was a good deal of minor sickness that did not warrant relief from duty. Of this class the most common was tinea in several forms. Most of the men have ascaris lumbricoides and report for treatment when worms are ejected from the stomach per orem, or when they excite symptoms of dyspepsia.

Venereal diseases show in the last quarter a slight increase over previous quarters, probably due to the fact that quite a large draft of men was received from Manila.

The drainage, heating, and ventilation of the ship are excellent.

In the early part of the last quarter the inside of the hull was scaled thoroughly and several tons of rust removed. A few rivets fell out and two parts of plates had to be renewed, but except for isolated areas of rather extreme thinness the hull plating is in fair condition. A week was spent in dry dock in Shanghai, but no ill effects as to health could be traced to that period.

In October and November the ship spent twenty days on a trip up the Yangtse River as far as Hankow, taking the United States minister on an official visit to the various treaty ports. The entire trip was made without incident of a sanitary character, except that several firemen became exhausted from heat in engine and fire room.

In the early part of the year smallpox was epidemic in Shanghai, particularly the old city. There was no case on board during the prevalence of the epidemic, but later in the spring a case developed which ended in death. Every man of the crew was revaccinated, and many who proved to be insusceptible to the virus were vaccinated again and again. The virus produced at the Shanghai vaccine farm proved to be as good as the Saigon virus. The case of variola which occurred on board showed good vaccination scars. The English, German, and Italian ships on the station suffered severely from the disease, especially the English cruiser *Iphigenia*.

During the year, 1 patient was sent to the Shantung Hospital in Shanghai, 11 to the Shanghai general hospital, and 4 to the United States naval hospital at Yokohama, Japan. The cases sent to the local hospitals do not appear in the reports as invalided to hospital because they are sent for treatment under the direction of the surgeon of this ship and are not discharged from the sick list. There is no sick bay on board and no good accommodations for a patient really ill.

No other epidemics were present in Shanghai during the year, but the bubonic plague passed by to North China and Japan.

There were 68 examinations for enlistment and reenlistment, with 22 rejections.

REPORT ON THE U. S. S. MONONGAHELA.

By **Thomas A. Berryhill**, *Surgeon, United States Navy.*

On October 22, 1899, the ship was at the navy-yard, New York, undergoing repairs. The sick bay was removed from the gun deck aft to the berth deck forward, a place so dark that the workmen of the yard were obliged to install temporary electric lights before they could see to drive a nail. In practice it has been found impossible to make a satisfactory physical examination in the sick bay. The sick bay is not large enough for the requirements of the crew of 400, and the patients who can not be accommodated therein are swung on the berth deck forward, where they are crowded because of the limited berthing space of the ship.

Before leaving the navy-yard the ballast was removed and the holds cleaned and whitewashed. The boiler for the distilling apparatus is on the berth deck, uninclosed, and in warm weather will make this deck uninhabitable on account of the heat.

Attention is particularly called to the position of the sick bay, which should be changed to the gun deck, as there is no apparent physical or military reason why it should not be so placed, allowing better ventilation and light and less crowding.

REPORT ON THE U. S. S. DOLPHIN.

By John F. Urie, *Surgeon, United States Navy.*

The *Dolphin* has been assigned to special duty throughout the year.

The first half of the year was spent at the Washington Navy-Yard, except for two intervals, one in March, of two weeks' duration, taken up in target practice in the Chesapeake Bay, and in repairing at the Norfolk Navy-Yard; and the other in April and May, at sea destroying wrecks, and again at the Norfolk yard making good the damages inflicted by a two-days' gale encountered on that duty.

The time from the first of July to the latter part of October was a period of cruising between the different naval stations north of the capes of the Chesapeake, and the last two months of the year were employed in making passage to the mouth of the Orinoco River, and in the survey of that locality. Port of Spain, Trinidad, was visited on this journey; La Guayra, Venezuela, touched at.

No change in construction effecting the sanitary condition of the vessel has been made since the last report.

The plant for forced ventilation leaves much to be desired. The blowers are old and inefficient and the conduits out of repair and in some places entirely disconnected. Fortunately, the natural ventilation of the living spaces between decks is good, and the need of an efficient mechanical system is not so keenly felt as would otherwise be. The natural ventilation, furthermore, is supplemented by electric fans placed advantageously in the different living spaces fore and aft.

This vessel is not provided with a sick bay. When in touch with shore hospitals, as in its customary employment, the want of a suitable place for the care of the sick is not of great moment. At sea, however, and on duty such as encountered during the latter part of the year the lack of proper consideration for the sick becomes a more serious matter. For two severe and protracted cases the commanding officer assigned the after upper cabin as a place for their treatment, and nothing better could be desired on shipboard. It can readily be seen, however, that conditions might arise making this part of the ship unobtainable for hospital purposes.

The general health of the ship's company has been good throughout the year. Infectious diseases were represented by 27 cases of malarial fevers, 2 of typhoid fever, 2 of pulmonary tuberculosis, 2 of parotitis epidemica, 3 of catarrhus epidemicus, and one of vaccina. Fourteen cases of venereal diseases of severity sufficient to prevent work applied for treatment during the year, and, of these, 2 were of primary syphilis and 4 of secondary.

Six hundred and sixty-three days were lost through sickness on this vessel during the year. The cases of malarial infection were all contracted at the Washington Navy-Yard, and, with one exception, were fevers of the intermittent type, tertian variety, and mild in character. The simple hyaline and pigmented forms of the parasite were the only examples demonstrated in these cases. Washington was also the source of infection of the cases of typhoid fever and mumps.

PORT OF SPAIN, TRINIDAD.

This port has been the subject of many previous reports and no new information was obtained of value. Suffice it to say that the reputation of the city for attractiveness, cleanliness, and wholesomeness held in the past is still well deserved. The Colonial Hospital has lately made provision for private rooms for pay patients, and the best of care and treatment is to be obtained here. This hospital is provided with an ambulance service, and patients can be transported from ship to hospital with very little disturbance.

SANITARY CONSIDERATION OF THE SURVEY OF THE MOUTH OF THE ORINOCO RIVER.

The survey of the great mouth of the Orinoco River (Boca Grande) was begun on November 29, and has developed into an undertaking of unexpected magnitude.

The *Dolphin* is anchored just inside the bar and scarcely within the banks of the river. Her position gives her the benefit of the almost constant trade winds blowing from seaward, and from a sanitary point of view could not have been better chosen. Inasmuch as the larger part of the ship's company has been employed on the shore line erecting signals, and a number have been encamped on one of the islands forming the right bank of river for the establishment of the base line and for tidal observation, the benefit of the good anchorage has been enjoyed but by few.

The land, so called, for hundreds of square miles, forming the delta of the Orinoco River, presents fairly uniformly the same characteristics—a substratum of alluvial mud held together by the intertwining roots of the dense, tropical, swamp growth. The whole delta is cut up by a fine network of small rivers and water ways, through which it probably feels the influence of tidal waters throughout a greater part of its area, there being from 5 to 7 feet rise of tide at the river's mouth. The influence of the river is so great, however, that the water at low tide, even at the mouth, is so slightly affected by the sea as to be potable, being used by the people inhabiting the small settlements for drinking and household purposes.

From time to time a gentle land breeze replaces the more boisterous trade wind, bringing with it a host of mosquitos of no gentle temper. These insects are mostly small in size and somewhat indolent in movements. It has not been possible to identify the variety for want of proper books of reference. The parties working in the swamps getting out piles report another variety, more active and venomous, by which they are cruelly bitten. Venomous gnats and sand flies in addition to mosquitos are reported as making life a burden to the members of the parties encamped on shore.

Approaching the shore line the water shoals very gradually, and at low tide the flats are barely covered for miles to seaward and large areas are left uncovered. The officers and men composing the shore parties are obliged to labor for hours daily in this mud and shoal water, often submerged to their waists, and frequently wet from head to foot. In addition, the alternating exposure to tropical sun and rain and the subjection to hours of exposure in open boats to the strong sea breeze on the return to the ship at nightfall wet and fatigued, make a set of conditions hardly compatible with the maintenance of health. Thus far, however, there has been no sickness attributable to the influences of the structure of the country or to the demands of the work. One death from accidental drowning and a few bruises and cuts comprise the list of casualties.

There are two small collections of dwellings, scarcely large enough to be designated villages, some 8 or 10 miles from the anchorage, an

English police station on the east bank of the Amacura River, and a Venezuelan hamlet on the opposite. These settlements are ditched and diked to make the land substantial enough for building upon, and are established in small clearings in the dense swamps. They would seem to be situated in anything but a wholesome location for the habitation of man. Diseases attributable to malarial poisoning are prevalent, but as far as could be learned not as much so as the character of the country would lead one to expect.

On the opposite bank of the main river, on Cangrejo Island, is a small Venezuelan police station, smaller even in the number of inhabitants than those mentioned above. The camps for tidal and astronomical observation are pitched on this island, and several officers with different members of the crew have been living there from time to time since the beginning of the survey. The influence of the sea is shown more in the construction of this bank of the river than of the opposite. On this island, running along the river front, is a low sand strip forming, as it were, a backbone, though the main features are those characteristic of the whole delta. The river bottom also on this side shows a sandy construction. The camps have been pitched on this sand strip, and being to windward of the swamp land and in face of the prevailing sea breeze, are on the best site obtainable.

The temperature reading of the thermometer under cover gives 85° and 75°, F., as an average maximum and minimum at this time of the year, November and December. Though the season is designated the dry season, rarely a day passes without several rain squalls, mostly tropical in the abundance of their downpour. The sea breeze as a rule quickly dissipates the dampness and moisture left behind by these frequently occurring showers, and no great discomfort is inflicted and no harmful results feared.

How much infection of the ship's company with malarial poison is to be feared on this expedition is as yet a question. It would seem as if all the conditions were present for the easy acquisition of diseases from this family of infectious agents, viz, tropical swamp lands for breeding media, mosquitos as inoculating agents (?), and unacclimated soil, with resisting power more or less reduced by unusual, hard work and exposure to sun and rain for infection. The swift-moving currents and the far-reaching influence of the tides may, however, lessen the nutrient value of the swamp culture medium, and the infectious agent be in less force than expected. It may be possible to answer this question in the report for next year.

REPORT ON THE U. S. S. MONTGOMERY.

By ALBERT M. D. MCCORMICK, *Passed Assistant Surgeon, United States Navy.*

During the year the ship visited the following ports: Norfolk, Va.; St. Pierre, Martinique; Port Castries, St. Lucia; Para; Pernambuco (three times); Rio de Janeiro (three times); Montevideo (twice); Monrovia, Liberia; Freetown, Sierra Leone, and Buenos Ayres. Total cruising distance was 13,000 miles. At Norfolk smallpox was prevalent, consequently such of the crew as could not show evidence of recent successful vaccination were revaccinated, 79 in number, giving a total percentage of success of 49.36. This unusually large percentage for revaccination was attributed to the fresh vaccine and to the fact that the scarification was made with the blade of a lancet, which gives a better surface for absorption than scratching made by ivory points. There were 8 cases of vaccina incapacitated for duty. During the three months' stay at Norfolk the following general infectious diseases occurred on board: Catarrhus epidemicus, 25 cases; febris intermittens, 2 cases; febris pneumonica, 1 case; parotitis epidemica, 11 cases; rheumatismus art. acutus, 4 cases; morbilli, 1 case. Pneumonia complicated 1 case of catarrh and terminated in abscess of the lung, empyema, and death. The victim had a history of alcoholism. The mumps were introduced on board by an apprentice boy returning from leave. There was only one sick day in my records for the 11 cases, as they were promptly sent to the hospital. The case of measles was of interest because it occurred during the epidemic of the grip, and was diagnosed as that disease until the eruption appeared on the third day, when the catarrhal symptoms had another signification. A case of chicken pox occurred at St. Pierre, twelve days from Norfolk, where the infection had undoubtedly been received, as the patient had not been ashore at St. Pierre. It is remarkable that the measles and chicken pox occurred as sporadic cases, as there were 44 apprentice boys in the crew.

At St. Pierre malarial fever abounds, often taking the form of hæmoglobinuric or "black water" fever. Malaria is also common at Port Castries, but much less so since the swamp land at the head of the harbor has been filled in. Yaws has been a common disease in the island. It is a contagious disease, having a fungating incrusted eruption, often becoming chronic, with the formation of ulcers. The contagion is thought to be carried by flies from the unhealthy sores to abrasions or fresh cuts in healthy persons. There is now an isolation hospital for these cases, and the disease is being stamped out. In the general hospital at St. Lucia I saw many cases of anæmia, due to the intestinal parasite ankylostoma duodenale; they were chiefly among the East Indian coolies who had been imported to work the plantations. The favorite remedy used in the hospital for eradicating the parasite was thymol.

Seven of the above-mentioned cities are situated in the Tropics, and the majority of these are unhealthy, consequently special hygienic precautions were taken to guard against tropical fevers. The most stringent precautions were taken at Para, as that port is unhealthy at all seasons, and yellow fever was known to be prevalent there at the time of our visit. The following recommendations were made to the commanding officer:

1. That the ship be thoroughly clean before entering port.
2. Communication with the city to be as limited as possible.
3. The coaling to be done by the ship's force and no coal to be handled in bags.
4. That there be no unnecessary exposure to the heat of the sun, and no exposure after sunset.
5. The men to avoid getting wet by the rain, if so, the clothes to be changed immediately; if wet by perspiration, not to rest or sleep in a draft.
6. No one to sleep on deck unless under the awning.
7. No work between 11 a. m. and 2 p. m.
8. Coffee to be served when the men turn out.
9. The harbor water not to be used on deck and no bathing in harbor water.

10. The bumboat not to be allowed, and no fruit or provisions of any kind to be brought on board.

These recommendations were carried out, except in coaling the ship it was thought advisable to have the natives work in the lighters and hoist the coal on board, where it was handled by the ship's force who worked under the awning and did not come in contact with the men from the city.

The first recommendation was made because the ship had been lying alongside the dock at the navy-yard for six months, and dirt had been ground in and was thick in places. By much scraping, scrubbing, and shellacing, she became thoroughly clean.

During our stay at Pernambuco in June and again in September, the general health of the city was good and there were only a few sporadic cases of yellow fever. Liberty between 2 p. m. and sundown was given first-class men. The men were cautioned not to drink water or eat fruit on shore. I found that the same opinion prevailed both in Brazil and on the west coast of Africa in regard to fruit gathered and eaten in the middle of the day, when it is hot from sun heat; that is, it will derange the digestive system and predispose to an attack of fever. There are a few precautions which the natives of yellow-fever regions insist upon as necessary, and as they are reasonable, it is well to remember them, viz:

1. Avoid sun-heated fruit; getting wet and remaining so, and exposure to unhealthy places at night.

2. Guard against constipation; the bowels should be moved once a day, and liver kept active by podophyllin or calomel. The former is preferred by native physicians.

3. Avoid debauchery, though a temperate use of Scotch whisky is recommended, as Scotch whisky is said not to have the constipating effect of American rye.

While the ship was at Pernambuco in June, a cockswain died from the combined effect of drinking the alcohol of shellac mixture and organic disease of the heart.

During the third visit to Pernambuco in November, liberty was not given to the men as the yellow-fever season was beginning. Yellow fever does not occur in such severe epidemics in Pernambuco as in other Brazilian ports, for the reason that it is naturally a clean city. The thickly populated portion lies between the sea and the Capibaribe River, and the latter by its tortuous course divides this portion into three parts, consequently there is good drainage, and the prevailing sea breeze (southeast trade wind) keeps the air pure. There is no health department in the city, and no attempt made at isolation or disinfection, so if it was not for the natural advantages the yellow fever would be perennial, as the temperature is favorable. The unhealthy months are February and March. As the first stop at Rio de Janeiro was during the month of June, the end of the yellow-fever season, general precautions were taken, such as the restriction of liberty, only officers, chief petty officers, and stewards being allowed to visit the city; the using of harbor water on the decks only at flood tide. The ship being anchored much nearer the entrance of the harbor than the ships of the squadron during the revolution, the harbor water just after flood tide was comparatively pure sea water. Fresh water was also obtained from shore for scrubbing purposes when the turn of the tide was not convenient.

The sea breeze is also more effective at the present man-of-war anchorage. During the second visit to Rio, the latter part of August and 1st of September, the sanitary regulations conformed to those of the flagship. During the third visit in November, yellow fever continued sporadic, but smallpox existed as a severe epidemic, 70 deaths having been reported for the week previous to our visit. The officers went ashore as usual, and the stewards sent for marketing between 6 and 8 a. m. were cautioned to avoid the unhealthy parts of the city.

Coming twice from Brazilian ports to Montevideo, the ship was quarantined each time at Flores Island, the first time in June. The soiled linen and men's hammocks and bedding were fumigated on the island, then the ship was allowed to proceed to the anchorage off the city, but to continue in quarantine for twenty-four hours. It is the custom to quarantine against Brazilian ports for nine months out of the year; the exceptions are July, August, and September. The second experience occurred in November, when the fumigating process was repeated, and we were directed to wash the woodwork of cabins and living spaces with antiseptic solution, the method being left to our discretion. Five days' quarantine was then imposed. Extra precautions were being taken to guard against the bubonic plague which was prevalent in Santos, and sufficient to make all Brazilian ports suspected. We found that the best way for passengers to reach Montevideo during the period of quarantine is to take the Royal Mail at Rio for Buenos Ayres. This line carries an Argentine sanitary inspector, and if no cases of fever occur during the five days' passage to Buenos Ayres, pratique is given. Boats run daily from Buenos Ayres to Montevideo. The Royal Mail is the only one of the three lines connecting with the Lamport and Holt steamers at Rio, that makes this arrangement, and it saves much trouble, time and money, not to mention spoiled raiment.

The *Montgomery* sailed from Pernambuco on October 6 for Monrovia, arriving October 14. As our stay on the west coast of Africa was considered to be of indefinite duration, the following sanitary measures were recommended:

1. The anchorage to be at least a mile from land, and, if possible, to windward, thus avoiding mosquitoes, which, in malarial regions, inoculate persons with germs of malaria.
2. If the ship is anchored in a river or land-locked harbor, no harbor water to be used on deck.
3. The awnings to be constantly spread to avoid exposure to the heat of the sun by day and the dew at night. If there is no breeze, the awnings should be triced up for an hour after sunrise and an hour before sunset.
4. All drills to be suspended.
5. A native boat crew to be employed.
6. No liberty to the enlisted men.
7. The leave of officers to expire at sunset.
8. All persons cautioned against drinking water on shore and unnecessary exposure.
9. If for any reason there should be a long exposure on shore, quinine should be taken as a precautionary measure.
10. The observance of the usual precautions in regard to airing bedding, sleeping under the awning, drinking distilled water, etc., is very important.

Monrovia is a town of 4,500 inhabitants, the population being made up of two distinct people—the Liberian or Afro-American and a native tribe called Kroos. The former number about 2,500 and live on the elevated land of Cape Mesurado, in well-constructed houses, many of which are built of brick, and, being designed by the first colonizers, are after the fashion of those of the Southern States. Their style of architecture is not suited to the climate, for during the long wet season the bricks, being porous, become saturated with moisture, the rooms become damp, and there is no means of drying them. The necessity of free ventilation is not appreciated by the negro race, and the windows of the houses are not properly made use of for airing purposes. The Kroos live on the lowland, which is a sand bar formed at the mouth of the St. Paul River. Their huts are made of cocoa and palm leaves, which turn the water and keep the inside dry. At the same time, the walls not being compact, there is free circulation of air. These huts have six or seven rooms, but are overcrowded, as a man has as many wives as he can buy. It is worthy of note that the Afro-American population is on the decline, while that of the Kroos is increasing, which may be attributed to the difference in their mode of living and to the fact that the Kroos have never lost their acclimatization by transplantation. Besides the difference in dwellings, the question of dress may be considered. The Liberians, being more advanced in civilization than their more or less fortunate brother, wear too many clothes, which interfere with the proper functioning of the skin. The Kroos wear no more than nature intended for the Tropics, and being the watermen of the country, their skins are kept in good physiological condition.

The principal food of the Liberian consists of rice and palm oil; that of the Kroos is cassava, which is potato as well as bread. It is a starchy root, but contains enough gluten to give the consistency of dough when it is pulpified in a mortar. This root contains too much cellulose to be depended upon as a constant article of diet. The palm oil, which is so largely used, is very crude, often causing gastrointestinal irritation and jaundice. Fresh meat is rarely eaten. There are few cattle and those are very small. The butcher will not kill unless all parts are engaged, and as the meat is 16 cents a pound, whether it is cut from the neck or tenderloin, it is not easy to dispose of a carcass. All parts of an animal are eaten; there is no waste, and one never sees buzzards in the streets, the usual scavengers in tropical towns which have surface drainage. Salt meat is also very dear, bacon selling at 35 cents a pound. As a result of the poor diet there are many instances of malnutrition. The diet of the Kroos is varied with fish, but fish, and even chickens, are scarce with the Liberian. They say it does not pay to raise chickens, as there is so much confusion between meuum and tuum. The gardens have gone to weeds, and even the potato patch is neglected. Though the Irish potato does not thrive, the sweet potato flourishes. The water supply is from shallow wells, which are often near cesspools. Toward the end of the dry season the water appears milky, and if the season is unusually prolonged there is a water famine, and at that time the city is particularly unhealthy. Even then the Krooman has the advantage, for he has no cesspool, and he buries a barrel in the sand and gets comparatively pure water.

The scourge of the country is African fever, which is malarial fever, and being tropical malaria is apt to be fatal, especially to white people, and to a less degree to unacclimated negroes. The natives also suffer from the fever with this difference, that the newcomer has the intermittent fever at first while the natives have the continued or remittent form from the outset. The liver seems to be the organ which suffers most in both forms, its action being always deranged, and in most cases there is bilious vomiting. The mortality varies greatly; few newcomers survive. The death rate of those living in Monrovia was estimated to be about 20 per 1,000, but there are no statistics to be relied upon. There are four physicians in Monrovia. One informed me that he was a graduate of Harvard. He told me that the medical man was rarely called to see a patient until it was too late, as each household had its decoction of herbs, which, as a rule, purged one so that there was no strength left to cope with the disease. Large quantities of quinine are given, but not judiciously. A white missionary who had been in the country about twenty years said the fever was not fatal if treatment was begun at the outset, and the method which had given the best results was to give a full dose of podophyllin and on the following day 20 grains of quinine. A peculiarity about the onset of the fever is that the person often feels unusually gay for about twelve hours, and will not believe it possible that he or she is about to be ill; then the rigor commences with its pains and aches, which are described as being like the grip. The patient rapidly becomes weak and anæmic from the destruction of the red blood cells. Yaws, syphilis, and erysipelas are common diseases. There is no hospital, and there are no regulations for sanitation, either public or private. As there are no means of enforcing quarantine, the city was recently threatened by an invasion of the plague when that disease was prevalent on the Gold Coast.

Monrovia possesses many natural advantages, and with proper regard to sanitation it should be as healthy as any other city situated in the tropics. The elevation is sufficiently high for drainage; the soil, being sandy and gravelly, is good for foundations; the temperature ranges from 60° to 90° F., and there is a land or sea breeze almost constantly. Deep wells should be sunk, and the water collected during the rainy season and properly stored in cisterns. Proper attention should be given to drainage and the disposal of sewage. The dense tropical growth should be cut down from around the city, thus doing away with decaying vegetation and mosquitoes. The swarms of flies could be lessened by preventing the cattle from grazing in the streets, the principal pasture land, for as there is no traffic, and there are only footpaths in the broad thoroughfares, the rest of the space is grassgrown. The raising of cattle, hogs, and chickens should be encouraged. An old inhabitant told me he could understand how people became cannibals, as he became so meat hungry at times and could not gratify the desire. The cultivation of such produce as the land produces should be encouraged, for surely during my short observation and experience the demand was greater than the supply of all edibles, whether fish, flesh, or fowl.

Freetown, Sierra Leone, was founded by the British for the same object that Monrovia was by the people of the United States, and had the same struggles for an existence, as the climate was deadly, and is now far from salubrious. It has the advantage over Monrovia in having an excellent harbor, and is now an important seaport town, with a population of 30,000 people. It is also a British stronghold, barracks having been built upon the top of the surrounding hills, Black regiments having white officers are stationed here. On account of the unhealthy climate, the British officers, whether civil or military, are sent to the Canary Islands to recuperate for two months during their first year's duty, and after been stationed at Freetown for eighteen months they are sent home for six months on full pay and all expenses paid. After this they are transferred to another station.

It is only a question of time when a newcomer will have the fever. Major Ross, who was sent out to Sierra Leone by the Liverpool school for the study of tropical fevers, to investigate the malaria-inoculating mosquito, had completed his researches shortly before our arrival, and proved the *Anopheles claviger* to be the guilty one of the mosquito family. The good influence of the British is seen in the sanitation of Freetown, as there is an air of cleanliness about the place and of health and thrift about the people. Provisions are plentiful and cheap, except meat, fowls, and eggs; beef is dear because the French impose a tax on all bullocks driven in from their country back of Sierra Leone, and the native tribes who lived up the river and supplied fowls and eggs were exterminated by the British in November, 1898, as they rebelled against the hut tax and marched against Freetown.

There are three hospitals in Freetown, all in charge of colonial surgeons, who do a large dispensary practice, as there are many minor complaints, as sore eyes, ulcers, etc.

The ship arrived at Buenos Ayres November 29, and remained through the month of December. The sudden change from three months in the tropics to the variable climate and dust-laden atmosphere of Buenos Ayres produced many disturbances of the air passages and alimentary canal. Nearly everyone in the ship's company suffered from diarrhea, which was sometimes associated with nausea, vomiting, and severe colic. Distilled water was constantly used, and therefore the water supply could not have been a factor in causing the ailment. There was no serious sickness.

Buenos Ayres is well provided with hospitals. Each of the principal nationalities composing the population is represented, as British, Italian, and German, besides 12 Argentine.

The sick of our ships are well cared for at the British hospital, which is well appointed and conducted. The rate is $1.50 per day. There is also a British hospital for convalescents near the city. The city maintains an excellent ambulance system.

The water supply of the city is from the Rio de la Plata, and therefore requires much filtering before it is fit for use. Typhoid fever is common.

In regard to the health of the ship for the year, the percentage of sick has been seemingly high (2.35), but not so when it is considered that no one has been invalided to hospital since April 15, all the cases having been treated on board, although there is no sick bay, and all the facilities for treating the sick have to be improvised. The dispensary, the only place for the care and treatment of the sick, is small, being 6½ by 7½ by 6½ feet; this with a complement of 260 men.

The ventilation of the ship by artificial means is practically nil. There is one fan for exhaust, none for supply. The ducts leading to the distant compartments have many sharp angles, and are now, after seven years' use, partly occluded by dust.

The flushing of the head is by a constant stream of water, but the trough is of faulty shape, as the excreta fall upon the back and formerly remained untouched by the water which flowed in from one end. I suggested a perforated pipe to extend along the upper margin of the trough, and by means of this the flushing is more thorough.

REPORT ON THE U. S. S. DIXIE.

By George B. Wilson, *Surgeon, United States Navy.*

The U. S. S. *Dixie* is a single screw, steel, converted cruiser of 6,145 tons displacement.

The *Dixie* was placed in commission at the navy-yard, League Island, Pa., November 15, 1899, as a training ship for landsmen. Originally she belonged to the Morgan Line of steamers running between New York and New Orleans, and was purchased by our Government during the recent war with Spain. After the war she was transferred to the War Department and used by that Department for transport duty, but later returned to the Navy and has since been refitted for the above-assigned duty.

The living and berthing spaces for the men are all that could be wished for, there being no compartment bulkheads, save one, which is located on the berth deck a little abaft midships. The excellent height between decks, combined with the long and uninterrupted sweep fore and aft, affords free ventilation. An abundant supply of air is supplied to the gun deck by the large hatchways and air and cargo ports (now used as gun ports).

The berth deck is also well ventilated by means of hatchways and air ports. The various storerooms, located on the orlop decks, are commodious, cool, and well supplied with air. The berth deck is painted with a composition shellac, as is also the gun deck, except amidships where constant and heavy wear precludes its use. These decks are heated by steam, inadequately in cold weather, however, but more radiators placed about the decks would remedy the defect. Three Buffalo forge blowers force air into the holds, which is the only attempt at artificial ventilation throughout the ship. Throughout all living spaces the metallic work is coated with cork paint.

SICK BAY.

The sick bay is located in the extreme forward part of the ship on the berth deck. It is large (3,740 cubic feet), light, well heated by steam, and ventilated by means of air ports and an air shaft communicating directly with the open air on deck. Eight persons may swing comfortably in this space. Unfortunately the chain locker is just forward of the bay, and the anchor engine is located overhead. A more suitable place for sick quarters would be a little forward of midships on the gun deck. The dispensary is located just outside of the sick bay on the port side. It is of good size (875 cubic feet), well appointed, light, and airy. The medical storeroom, located on the forward orlop, starboard side, is all that could be desired.

There are three cells situated about midships on the berth deck, each having a cubic capacity of 343 feet. They are ventilated by means of perforations through the doors and partitions. The wash rooms for the crew are of good size, having pivoted iron porcelain-lined bowls supplied with fresh water through a system of pipes. The water-closets throughout the ship are sufficient and of excellent sanitary design. The engine and fire rooms are exceptionally large and comfortable. Four large ventilating tubes, communicating directly with the open air above the superstructure, are provided to both engine and fire rooms. The shaft alley is also provided with a similar tube for air supply.

WATER SUPPLY.

Two Baird's evaporators are in use for supplying the drinking and wash water. Each has an estimated capacity of 5,000 gallons daily, but no test has yet been made of their actual capacity under service conditions. The ship is unprovided with an ice machine. The need for such a machine is very prominent, and were one installed the conditions under which the crew live would be greatly improved.

OFFICERS' QUARTERS.

The captain and the executive officer are quartered in the forward deck house. The navigator, one watch officer, and the engineer officer have their rooms in the midship house abaft the engine room and galley. Forward of the galley is the warrant officers' mess room. The warrant and three wardroom officers have rooms on the gun deck. The wardroom, mess-room, and rooms for six wardroom officers are in the after spar-deck house. No provision is made for ventilating the officers' rooms in the middle and after deck houses, except by direct draft through the port or doorway. Inboard the houses have a solid partition dividing them fore and aft in the midship line. The doors to these rooms, communicating directly with the deck, are a source of danger to the health of the occupants, and during the past month all the officers have suffered from severe colds directly attributable to that cause. It also remains to be demonstrated whether in tropical countries and hot weather these rooms will be habitable, owing to the direct heat of the sun. To obviate this condition I would recommend that overhead awnings be provided. The efficiency of the heating apparatus provided for these rooms is very much impaired by the cold drafts of air striking them through the opening and closing of the doors, which, as before stated, form the only means of ingress and egress.

REPORT ON THE U. S. S. HARTFORD.

By EDWARD R. STITT, *Passed Assistant Surgeon, United States Navy.*

The historic *Hartford*, after an extended period occupied in rebuilding, was, on October 2, 1899, again put into commission, retaining all the advantages of a wooden vessel and at the same time supplied with the latest advances in sanitary and mechanical appliances generally found in steel ships alone.

The gun deck, which was added to the vessel after the civil war, and subsequently done away with during the period of commission prior to the present one, has been restored. A great change, however, has been effected by constructing the overhead spar deck and upper part of the sides of the ship of steel, replacing the obstructing wooden knees and beams with metal frames, so that the appearance of the main deck is similar to that of the *Chicago*, not in the least resembling the gun deck of a wooden ship. The space between decks is very lofty and is obstructed fore and aft only by the six 5-inch guns on either side and the boiler and engine-room hatches amidships, giving an available cubic air space of 44,597 cubic feet.

As arranged at present there are 330 persons billeted on this deck, the cubic air space per man amounting to 135 cubic feet. Ventilation on this deck is effected by means of hatches, skylights, gun ports, and two ventilators forward between the water-closets, there being no connection with the system of artificial ventilation in operation on the deck below. Under ordinary conditions of cruising or lying at anchor there is sufficient diffusion of the atmosphere without to render the percentage of impurity comparatively low; but in cold, stormy weather, when almost every avenue of natural ventilation would be closed, it is probable that the proportion of organic impurity would be excessive. Should such a condition be found to obtain during cold weather it would seem to be sufficient to warrant the extension of the air ducts upward from the berth deck to the gun deck.

The berth deck is well supplied with natural means of ventilation through hatches, ventilators, wind sails, and air ports. These latter, however, are kept constantly closed at sea. The air on this deck, with the exception of the quarters of the warrant officers, a space extending forward of the wardroom for a distance of about 30 feet, is remarkably free from closeness, even when the system of artifical ventilation is not in operation.

The available cubic air space on that part of the deck where the men are billeted is 20,678 cubic feet, and the number of persons berthing thereon is 134, affording an air space per man of 154 cubic feet—the excess of 19 cubic feet over the individual air space on the gun deck not by any means representing the measure of greater purity of the air on the lower deck.

The after portion of the berth deck is taken up by the quarters of the wardroom officers, the air space amounting to 10,656 cubic feet, the air space per occupant being 819 cubic feet. The arrangement of the wardroom is most satisfactory, the pantry being forward of the quarters, with an open hatch at the door which has no connection with the mess room. The ventilation of the wardroom country is unusually good, this being effected by 2 large trunks leading to the spar deck, 5 ventilators and 4 ducts connected with the artificial system of ventilation. Each of the 14 staterooms has an air duct and in addition is supplied with an electric fan. It is necessary to keep the air ports closed practically at all times when at sea, in consequence of which the increase in means of ventilation afforded by these openings can only be made of avail when in port.

The quarters of the warrant officers are just forward of the wardroom and comprise 7 staterooms, a mess room, and a pantry. The space, about 40 feet in length on either side, contains 8,500 cubic feet. Although the individual air space, 1,210 cubic feet, is greater than that for wardroom officers, yet by reason of the fact that the only open hatch is at the after limit of this space (all connection with the spar deck being inclosed in engine and boiler room trunks for a distance of about 80 feet forward), the circulation of air is most sluggish, rendering the staterooms almost uninhabitable while in the Tropics.

The dispensary, which during the former commission was on the starboard side of the berth deck, has been placed on the port side, amidships, communicating by a door with the sick bay just forward of it. The dispensary contains 350 cubic feet of air space and is provided with an excellent dispensing counter, having a sink at one end. The waste water empties into a square receptacle below the sink and must be emptied by hand. One of the bulkheads is covered with sheet brass, which extends overhead, and against it is secured a folding shelf supplied with cleats to hold the sterilizer; this arrangement has been found to be most satisfactory, as there is no taking up of space when the apparatus is not in use, and it has been found that even when the ship was rolling heavily there was not the least difficulty in using the sterilizer.

The sick bay, with an air space of 1,482 cubic feet, is located on the port side in the forward third of the berth deck and is far enough aft to make the rolling and pitching of the ship easy.

The ventilators and hatches are quite accessible—a large hatch opening on the berth deck at the forward end of the sick bay and a very large ventilator (20 inches in diameter) at the after end. With these natural means of ventilation the air has as a rule not been close, and when the blowers are in operation and the air ports open the ventilation is unexceptionable. There are 6 folding bunks of the service pattern arranged in tiers along the inboard bulkhead; along the outboard side there is a wide, cushioned transom. Just forward of the sick bay, and separated therefrom by a wooden partition, are the bath tub and water-closet. This latter is a pump closet, known as the "Neptune," and is apparently free from the objectionable features usually associated with water-closets discharging under the water line, and at the same time is compact and easy to keep clean.

The two 48-inch Sturtevant steam exhausters are placed amidships on the berth deck forward of the boiler-room hatches and have a capacity each of 5,000 cubic feet per minute at a speed of 200 revolutions per minute. That they are at least as effective as the specifications indicate was shown on one occasion when the smoking of the galley fire filled both berth and gun decks with smoke; within 4 minutes after starting the blowers both decks were completely cleared. The combined air space is about 65,275 cubic feet. There is no connection between the ducts from the exhausters and the bilges or coal bunkers, these latter being provided with ducts which open by louvers on the spar deck.

The dynamo room, on the gun deck, amidships, has most excellent ventilation, a hatch opening overhead, so that when the plant is in operation the temperature does not exceed 90° to 95° F. under the equator and in cool weather rarely goes beyond 78°.

The distiller and evaporator are rated to produce 3,250 gallons of fresh water daily. As a matter of fact this amount was exceeded on one occasion.

The temperature in the engine room, when steaming, has averaged about 105° F. in cool weather and 110° under the equator; that of the fire room has averaged 82° and 95° under corresponding conditions.

The ship has proven herself very dry at sea, the spar deck not even taking spray during two moderate gales. The waterways running on either side of this deck are so arranged that should a sea be shipped the water would quickly run off.

The number of landsmen under instruction would appear to exceed by 30 or 40 the accommodations of the ship, as evinced by the difficulty in stowing the hammocks of 464 men and as regards ample space for storing of provisions and clothing. Owing to the fact, however, that the percentage of sick while in port was about 1.7 and at sea but little more than 1 per cent, this matter, so long as present conditions pertain, does not assume importance in a sanitary report.

The measurements to determine the physical development of the recruits show a remarkable increase in height since enlistment and a considerable increase in weight; the muscular and chest measurements have not, however, shown any decided gain. The second examination was made at the end of the year 1899 before the effects of sea life and sail drill could act as factors; so that it is expected that the measurements to be taken at the end of the first quarter, 1900, will show to better advantage.

The data on which the following averages were calculated come from the measurement of 251 landsmen, this being the number in whose cases two records were obtained. Average result at first examination: Age, 21$\frac{1}{12}$ years; weight, 139 pounds; height, 66.6 inches; mean chest circumference, 33$\frac{1}{2}$ inches; chest expansion, 3.2 inches; circumference of arm, 11.7 inches; circumference of thigh, 19.7 inches; circumference of leg, 13.9 inches.

At the second examination, taken about four months later, the averages were as follows: Age, 21$\frac{5}{12}$ years; weight, 148 pounds; height, 68 inches; mean circumference of chest, 33$\frac{1}{2}$ inches; chest expansion, 3$\frac{1}{2}$ inches; circumference of arm, 11.9 inches; circumference of thigh, 20 inches, and circumference of leg, 13.7 inches.

From the above it will be seen that as the result of the regular life in the naval service there has been an average gain among the landsmen of almost 10 pounds in weight and more than an inch in height. This remarkable gain in height is probably due in large part to the fact that the military bearing which has been attained since entering the service induces an erect carriage. The mean chest measurement has remained about the same, with a slight increase in chest expansion. The measurements of the extremities showed but slight gain in muscular development.

The first and second records were made by different medical officers, so that personal equation is a factor to be taken into consideration in estimating the value of the above average increase.

As affording comparison, the following averages, given in the Medical Record of December 9, 1899, are appended. Prof. Dudley Sargent, from measurements of several thousand students at Harvard University, obtained the following averages: Age, 22$\frac{1}{4}$ years; weight, 156 pounds; height, 68$\frac{1}{2}$ inches; mean chest measurement, 35$\frac{1}{2}$ inches, and circumference of arm, 11$\frac{1}{2}$ inches. Of the British recruits the results on the average are given as follows: Age, 19$\frac{1}{3}$ years; height, 65$\frac{2}{3}$ inches; weight, 126 pounds; mean girth of chest, 34$\frac{1}{4}$ inches, and chest expansion, 1$\frac{1}{2}$ inches.

REPORT ON THE U. S. S. YORKTOWN.

By Robert M. Kennedy, *Passed Assistant Surgeon, United States Navy.*

The general health of the officers has been exceptionally good and of the crew fair.

A most interesting case was one of appendicitis. The patient was suddenly seized with intestinal colic. The following day the pain became localized in the right iliac region and McBurney's point of tenderness was marked. The abdominal muscles on the right side became rigid and the right thigh flexed. There was constipation, no vomiting, and the temperature ranged from 99° to 100° F. There was retention of urine. The general condition of patient was excellent. On the third day the temperature rose very rapidly to 106° F; pulse 125 and weak; skin wet; in fact there seemed to be approaching collapse. The pain, tenderness, and rigidity of the abdominal muscles increased very much. Percussion and palpation gave positive results. The patient was transferred to hospital, perspired profusely during the entire night, and on the following morning the temperature was normal, with great relief of other symptoms, and recovery was complete and uneventful.

Another case of interest was one of carcinoma, either pancreatic or gastric, the symptoms of which were very ambiguous. The patient was elderly, and there was rapid and extreme loss of color, strength, and flesh and a persistent dull epigastric pain—never sharp. Anorexia was constant, but no nausea or vomiting. The cancerous mass could be felt through the abdominal walls, though palpation was difficult owing to the great tenderness. The stools at times were fatty. A diagnosis of pancreatic cancer was made. The patient was transferred to the *Buffalo*, and died en route to the United States after a total illness of about six months.

While this ship was in Hongkong for two weeks 20 per cent of the entire crew contracted venereal disease—principally gonorrhœa.

There were 48 persons examined for the naval service during the year; 25 were accepted and 23 rejected.

The ship has not been provided with a sick bay, and the past year has fully demonstrated that for the proper and efficient care of the sick and wounded one is necessary. I would recommend that one be built in the steerage.

No medical storeroom has been provided until very recently, when one was temporarily loaned to the medical department. In consequence of this deficiency the medical supplies had been much scattered.

The wardroom mess has two storerooms. One is ample, and I therefore recommend that the wardroom storeroom in the steerage be given to the medical department.

The favorable opinion expressed in my last report, as to the satisfactory condition of this ship's dispensary, has not been justified by the last year's experience. The dispensary is sufficiently large, and fairly well lighted, artificially and naturally, but in the Tropics the heat is intense, at times 110° F., and some of the drugs have rapidly deteriorated. The fault is due to a large condenser pipe that leads through it. In the Tropics the dispensary is not suited for its purpose.

The officers' closets, four in number, well ventilated, with cemented floors, are forward on the main deck, and although supplied with an insanitary type of bowl—"pan style"—are well kept and generally free from odor. An improvement could be made by the substitution of a more sanitary type of bowl. There is also a closet in the steerage bathroom, and I recommend its removal.

The officers' urinal is forward on the main deck. It is a glazed porcelain bowl, and is constantly flushed by a stream of water, and has proved very satisfactory.

The men's closets are situated well forward on each side of the main deck. There are 5 seats over an iron trough, which is constantly flushed by a stream of salt water. The sides of the trough accumulate more or less fecal matter, but on the whole are well kept, generally free from odor, and are frequently disinfected. The closets are well lighted and ventilated. The men's urinals are also forward on each side of the main deck. They are zinc troughs, constantly flushed with water and are fairly free from odor. I think it would be well to substitute for the present pattern a long porcelain-lined trough.

The temperature of the cell is very high in the Tropics, and when a person is confined, it is frequently found necessary to keep the cell door open.

The distilling apparatus has an estimated capacity of 1,800 gallons of potable water per day. Only distilled water is used.

The electric plant has proved very satisfactory, and the ventilating system has been efficient.

The sanitary condition of the holds, living spaces, and storerooms has been exceptionally good.

REPORT ON THE U. S. S. DETROIT.

By WILLIAM C. BRAISTED, *Passed Assistant Surgeon, United States Navy.*

During the past year the general sanitary condition of this ship, as indicated by the health of the crew, has been very good. The *Detroit* has been in commission seven years, and during that time in active service. There is, therefore, some deterioration due to prolonged active service. Then, too, many improvements in sanitary construction have been made in ships recently built. A complete overhauling and refitting in the near future is therefore desirable from a sanitary standpoint, and it is with a view to this that the recommendations in this report are made.

The space set aside for medical purposes consists of a small dispensary, and a fairly good storeroom. No direct provision is made for treating the sick. An additional space, capable of containing cots or berths of some kind, and constituting sick quarters should be set aside. Under ordinary circumstances a portable operating table could be set up in the sick quarters, and the necessary outfit, dressings, etc., for operative work be kept at hand for immediate use.

Much space is lost in the present dispensary by cumbersome woodwork. All this woodwork should be torn out, and the wall and floor, fitted with rounded corners and without cracks, should be enameled or provided with some smooth, easily cleaned surface. The racks for bottles and compartments for stowing material, shelves, etc., should be made of light open-work steel, enameled, with heavy plate-glass top for receiving sterilized articles, and all should be so arranged that they could be taken out, cleaned, and when not in use folded up against the walls to give additional space.

There has been a recommendation made, I believe, that a light deck, joining the topgallant forecastle and poop decks, be constructed, thus covering in the entire main deck and giving ample berthing space for the crew, who, at the present time, in cold and inclement weather, are sadly in need of protected living spaces. Should this recommendation be carried out, surely some provision could be made for small sick quarters. At the present time the sick must lie just outside the dispensary in a small compartment already overcrowded, and in cold weather when everything is battened down, apt to become very foul from contaminated air and excessively annoying to the sick from loud talking, noise, etc., that can not be controlled.

During the last six months severe cases have been allowed to use unoccupied staterooms on the port side of the berth deck, formerly the junior officers' quarters. Under the present conditions it would seem undesirable to attempt aseptic operations of magnitude in the little dispensary or the quarters outside set aside for this purpose, contaminated as they are with exhalations of so many people living there.

The closets for the men, forward on the main deck, are kept in sanitary condition. The construction of these closets might be vastly improved. If the floors and walls could be constructed without cracks and lined with a smooth polished tile or some substance giving a hard, smooth, finished surface, not easily attacked by the usual gases and drippings of closets, they could be easily kept in perfect sanitary condition.

The urinal should be constructed of soapstone or tiling, and the bowls be of as simple a design as possible, allowing smooth, hard surfaces and no spaces not easily cleaned.

The officers' closets are old, and though kept in good condition by frequent cleaning it would be far better to have them on the deck above—i. e., the main deck, where, with straight discharge pipes and a modern mechanism, they would be free from objection. The same remarks as to simplicity of construction, smooth, hard surfaces, rounded corners, etc., apply to these closets as to those of the men. Especially should the bowls be unboxed and stand far enough from the side of the ship to allow easy cleaning and complete inspection.

The ventilation of the ship has been fairly good, but I feel that this has been so on account of the cruise being in warm and tropical climates where natural ventilation has been possible. The ventilating system is an "exhaust" system only, and the apparatus has been in constant action and has been frequently tested. From a study of the ventilating systems in several ships, the idea impresses itself that the "inboard" delivery system is more satisfactory in general than the "exhaust." Although the exhaust system appeals to one theoretically, yet practically most observers living in ships seem to prefer the "inboard" delivery, and that system certainly increases the degree of comfort and well-being. Therefore it is recommended that a modern, double-acting ventilating system be introduced, and that care be taken to have the exhaust pipes large enough to allow the method by extraction every chance of effective work if used. I am inclined to think that sometimes the "exhaust" system fails on account of the small caliber of the extraction pipes. However, I may be mistaken in this. Special attention should be given to the ventilation of storerooms. I am under the impression that some of the storerooms in this ship might be improved in that respect, especially the paymaster's storerooms, over the forward magazines. Finally, it would tend to improved sanitation if much of the woodwork in living and other spaces could be torn out and replaced with smooth, easily cleaned surfaces. It is almost impossible to keep the fretted, scroll, lattice, and ornamental woodwork so common in some ships clean.

INCIDENTS OF CRUISE AND GENERAL REMARKS.

A few cases of malaria were contracted at the Washington Navy-Yard in June. The plasmodium was demonstrated by the microscope. Diagnosis is so much dependent on the microscope that every ship, whenever possible, should, I think, be supplied with the regulation outfit. The old outfit, including stains and appliances for section cutting, is useful, but deficient in objectives.

A one-twelfth-inch oil immersion objective is absolutely necessary to do bacteriological work. The smaller outfit supplied lacks this higher objective and thus defeats its use for most important work.

While in New York in July and August, lying at the navy-yard, dredging was going on, and this condition, as has been noticed on other occasions, seems to give rise to low fevers that disappear rapidly on changing location.

At Puerto Cabello, Venezuela, a mild form of catarrhal influenza prevailed, with one case of pneumonia resulting. I found on investigation that pulmonary troubles are especially common at Puerto Cabello, La Guayra, and Caracas. Tuberculosis is noticeably prevalent.

The climate of Caracas on account of its altitude, while cooler than that of the coast cities of Venezuela, impressed me unfavorably. It did not seem as dry and invigorating as one would expect. Macuto, on the coast, is especially healthful and delightful.

Hospitals at La Guayra, Caracas, Puerto Cabello, and Curaçao, were visited. All, except the military hospital at Curaçao, were disappointing. The military hospital at Curaçao is a modern and praiseworthy institution. It is built on the pavilion system, is beautifully kept, and has every necessary appliance for advanced work.

A few cases of yellow fever occurred at Curaçao among the inhabitants, but no other cases were found along the northern coast of South America. Cases were reported at Panama, and the movement of troops from Panama to Colon and Cartagena made at times a strict quarantine of the ship advisable to prevent any possible infection.

The general impression I gained from questioning many medical men in the yellow-fever districts, including our own Southern States, leads me to think that these experts in yellow fever doubt that the "bacillus icteroides" is the etiological factor in yellow fever. I have also found no one who will admit any marked success with the serum treatment.

I wish to call attention to good results following operation for the radical cure of inguinal hernia.

One case, a fireman, operated on at the New York naval hospital has been under observation on this ship. Under hard service conditions, exposed to the heat of the Tropics, the engine room, and the strain of severe muscular exertion (all tending to excite recurrence) this case has never complained or shown any tendency to recurrence. The union remains firm and the canal in good condition. The operation performed was after the Bassini method. I imagine reports from other cases will show equally good results.

The most interesting cases from a surgical standpoint during the cruise were those operated on (27 in all) at Puerto Cabello on November 12, after a battle between the forces of General Parades and General Castro. A report of these cases was forwarded at the time and are therefore not reported here. I might add that reliable information, received sometime after the date of operation, indicated that all the cases did well except one.

In this connection it may be of interest to know that no adequate medical provision seems to be made for the sick and wounded in these countries. After a battle many of the wounded crawl away and disappear; some die by the wayside and some linger at a hospitable house until dead or recovered, but without skilled professional treatment. A Red Cross Society was started at Caracas, but seems to have accomplished but little.

The dead after battle are, as a rule, not buried, but gathered in a pile, saturated with coal oil, and burned. This makes a ghastly spectacle, but is perhaps a good sanitary measure. Through the kindness of the United States minister at Caracas, I was enabled to meet a prominent and learned member of the medical profession of the country, who gave me much information as to climatic, hygienic, and medical matters in Venezuela. He especially called my attention to the luchosa, an indigenous fruit, from which comes our preparation of "caroid," and laid great stress on its properties as a natural digestant, highly prized in stomachic troubles.

The usual visit was made at each place to the leper hospitals and many interesting cases were seen. I was unable to convince myself that leprosy was markedly diminishing, although recent published statements state that it is. Nowhere did I find any enthusiastic workers among the lepers. They are generally well cared for and apparently carefully segregated when discovered.

Syphilis and genito-urinary troubles were reported as remarkably prevalent in the Venezuelan forces at Caracas a short time after the revolutionary outbreak. Many women, camp followers, cohabiting promiscuously, seemed to spread a virulent form of syphilis rapidly, and I was informed that 150 cases were in hospital.

At Key West the past epidemic of yellow fever, in the months of September, October, and November was of interest, but only one case developed among the inhabitants after our arrival. There seemed to be an opinion that some of the fever was dengue, and some possibly due to insanitary conditions resulting from soil disturbance. The total fever cases of all kinds were estimated at from 1,500 to 3,500. The total deaths 55. The crew was strictly quarantined, and no case of fever occurred.

A small sterilizing outfit is earnestly recommended for use on ships. The outfit should be of size sufficient for instruments and a small amount of dressings, and should be portable, to be carried ashore if needed.

The medical supplies of this ship have been excellent in quality and generally amply sufficient in quantity. What little I have been able to see of the outfit of other nations seems to show that the medical equipment of the American Navy is not surpassed by any other service.

In conclusion, I would state that the kindly cooperation of the commanding officer, and the great care of the executive officer to promote the health of the ship, by strict sanitation, has resulted in the ship's being practically free from disease most of the time.

REPORT ON THE U. S. S. HELENA.

By Lewis Morris, *Passed Assistant Surgeon, United States Navy.*

The 1st of January, 1899, found this ship at Naples, Italy. She left there January 4, 1899, for Piræus, Greece, passing through the Corinth Canal. On the day after arrival at Piræus, orders were received to proceed to Manila, where the ship arrived on February 19. Since that date we have been constantly on duty in the Philippine Islands.

We carried away from Naples a large number of venereal cases, six of which proved to be syphilitic. Some time after our arrival in the Philippines, the climate began to assert itself in numerous cases of furunculus, eczema, and impetigo, all of which yielded to the usual treatment.

About the only port where liberty was given to any extent was Cavite. That being a thickly settled garrison town, the men soon began to develop cases of gonorrhœa and chancroid. The types were severe, and cases generally had complications in the form of buboes, orchitis, etc.

The excessive rolling of the ship on the least provocation was productive of a number of more or less serious bruises, sprains, and one fracture.

Three members of the crew have developed tuberculosis pneumonica chronica. In but one is the disease traceable to hereditary influences; the others are thought to be due to conditions of service in this climate.

Of gunshot wounds, 7 were under treatment. Two were cases from small gunboats in Manila Bay, one of which was discharged cured and the other transferred to the United States naval hospital, Cavite. One case was that of an army officer wounded at Las Pinas (transferred to the United States Army hospital at Manila). Two of the remaining four were wounded accidentally on board and made a quick recovery. One case was severely wounded by the explosion of a 1-pounder shell picked up ashore (transferred to United States naval hospital, Cavite). The last was wounded on our tender, the U. S. S. *Mariveles*, and under treatment on the U. S. S. *Concord;* subsequently at the United States naval hospital, Cavite, and later, on this ship. Recovery was slow, owing to debilitated condition of patient.

Two members of the crew were mortally wounded while serving on board the *Mariveles*, the first dying on board that ship on day of occurrence; the other, some days later at the United States Army hospital, Iloilo.

In many of the expeditions which this vessel has from time to time been engaged in, she has carried from 40 to almost 300 men above her complement, and that with the treating of men on the small gunboats carrying no medical staff, has proved a large drain on the ship's medical stores.

I should like to mention the habit, now obtaining in the service, of loading the navy Colt's revolver, all six chambers. It is extremely dangerous, not only to the man carrying the piece, but also to those around him. When loaded in that manner, if dropped, it will go off with almost absolute certainty. One man was killed outright on this ship before my joining her, and another was badly wounded on the *Basco*, and I have just heard of another similar case on the *Monterey*.

If some provision could be made, or some order issued, whereby it would be obligatory to carry the loaded piece with one empty chamber under the hammer, the number of accidents traceable to the revolver would be greatly reduced.

The following ports were visited: Naples, Piræus, Port Said, Aden, Colombo, Singapore, Manila, Jolo, Zamboanga, Iloilo, Lingayen Gulf, San Pio V., Camiguin, Cavite, Subig Bay, Aparri, and Lallo.

REPORT ON THE U. S. S. WILMINGTON.

By Frank C. Cook, *Passed Assistant Surgeon, United States Navy.*

At the close of the year 1898 the *Wilmington* was at San Juan, P. R., en route to the South Atlantic Station and making a special cruise. The city of San Juan at this time was under control of United States military and naval forces, and the sanitary conditions of the place had been greatly improved. There were no important epidemics so far as I could learn. The ship left this port on January 2, 1899, and in making the cruise to Montevideo, Uruguay, the following places were visited: Port Castries, Santa Lucia, January 4 to 7; St. George, Grenada, January 8 to January 14; Port of Spain, Trinidad, January 15 to January 21; Orinoco River to Ciudad Bolivar, January 21 to 30; Port of Spain, Trinidad, January 30 to February 6; La Guaira, Venezuela, February 9 to 16, touching at Carúpano and Guanta, Venezuela, en route; Port of Spain, Trinidad, February 18 to 21; Georgetown, British Guiana, February 23 to March 1; Paramaribo, Dutch Guiana, March 3 to 6; Pará, Brazil, March 10 to 19; Amazon River, March 19 to April 28; Pará to Manãos, Brazil; Manãos to Iquitos, Peru; Iquitos to Manãos; Manãos to Pará; Pará, Brazil, April 28 to May 6; Maranhão, Brazil, May 9 to 12; Pernambuco, Brazil, May 16 to 22; Rio Janeiro, Brazil, May 28 to July 6; Santos, Brazil, July 7 to July 11; touched off Desterro, Brazil, July 13. Arrived at Montevideo, Uruguay, July 16.

At St. George, Grenada, where this ship had visited the previous year, small vessels may anchor in the harbor with stern moored close to the stone wall along the water front. The harbor is very small and all but surrounded by high hills; consequently very hot. The city is considered healthy, a great part being on high ground and well drained into the sea on one side and the harbor on the other. The British Colonial Hospital, located on one of the hills at one side of the harbor entrance, where it is well exposed to the breezes, is small but well managed, and has excellent accommodations for seamen. There is no regular means of transportation, but a patient may be landed in a boat at the foot of a path on the hospital grounds and carried the short distance by stretcher. On both visits of this ship much courtesy was shown by the medical officer in charge, and as medical officer of this ship I was invited to be present at all of the important operations taking place during our stay.

At Trinidad the United States minister to Venezuela came on board and the *Wilmington* proceeded on a cruise up the Orinoco River to Ciudad Bolivar, about 250 miles from the mouth and about as far as the ship could go. At this time of the year the weather on the river was very pleasant, the thermometer ranging at noon about 85° F. Bolivar, being located on rather high ground with most of the streets sloping toward the river facilitating drainage, was said to be a healthy place. Liberty was granted here during the day. La Guaira and Port of Spain, Trinidad, are two very well-known ports.

Georgetown, British Guiana, is situated on level and very low, swampy ground not unlike that of the Orinoco delta region, and at the mouth of a small river. The city itself is clean and well built, but can not be called healthy. There is said to be much fever of a malarial type. The British hospital is extensive and accommodates about 300, having a special ward for sailors. This ward is old, with the flooring in poor condition, and is not well provided for. The newer portions of the hospital are well equipped.

Paramaribo, Dutch Guiana, is a port very rarely visited by our vessels of war. It is a quaint old town, thoroughly Dutch in appearance, very clean, and located on much dryer soil than Georgetown. It is some 12 miles up a small river, and the surrounding country is low and level. I visited the principal hospital, and this is large, well appointed, and has excellent accommodations for all classes of patients. There were 250 beds, most of the wards having 14 beds each. A number of cases of leprosy were isolated in a separate building.

Pará, Brazil, is well known to our ships, not only as a very important and progressive city, controlling Amazon trade, but as an exceedingly unhealthy port. The time of our visit was not during their worst season for yellow fever, but the disease is endemic all the year. It had been some time since our men had been given general liberty, and it was granted here. Nothing developed as a result, with the exception of very few venereal cases. The governor of the State is a well-known physician in Pará, and is much interested in sanitary affairs. He hopes to stamp yellow fever out of the city before long.

The cruise up the Amazon River to Iquitos, Peru, 2,100 miles from the Atlantic, and to within 600 miles of the Pacific, was interesting.

The first Amazon port visited was Manãos, Brazil, about 800 miles from Pará, which was reached in four days after steaming night and day. This city is the second in importance of the Amazon Valley. It is located on rather high banks and is well drained on surface, but it is an exceedingly unhealthy place, yellow fever and malarial fevers predominating. A boom was in progress, and streets were being torn up for electric roads, new roads were being cut, and everywhere old buildings were being torn down or ground being upturned for new foundations. No general liberty was granted.

Yquitos or Iquitos, Peru, was reached on April 13, after steaming night and day, having left Manãos April 5, and touched at a few small ranches on the river banks for beef and green food for the animals collected on board. Iquitos is a small place, with nothing of especial professional interest. There is no hospital of importance. The general health was said to be good, for this place is located on one of the high banks rarely found in this part of the river. Could we have obtained sufficient coal here we should have been enabled to proceed some 200 or more miles farther up the river to almost the very foot of the Andes. The ship returned to Manãos and then to Para, not ascending the Madeira River, as was originally intended. The weather was not excessively hot at any time during the cruise on the river, the thermometer ranging between 80° and 85° F. in the shade. Evenings were particularly damp. Food, such as vegetables, eggs, and meat, is exceedingly scarce, as much as 10 cents apiece having been paid for eggs and about 45 cents per pound for meat. The richer class of people and foreigners subsist largely upon imported canned articles, while the poorer are content with cassava chiefly.

Upon return to Para there had been somewhat of an increase in yellow fever, and no liberty was permitted at night and no fruits allowed on board.

Maranhão is a small and apparently a commercially dead place. It is on high ground and said to be healthy.

We were over a month at Rio Janeiro, from May 28 to July 6, a greater part of the time in dry dock at the naval arsenal, close by the heart of the city, undergoing repairs to the shaft broken en route from Pernambuco. The dock was cut from a solid stone foundation. During the time we were in it no fires of any kind were allowed on board, and all cooking was done in a shed constructed for the purpose a short distance away. When the supply of fresh water on hand was exhausted shore water had to be used, but this was first thoroughly boiled in the shed where the cooking was done. A stone water-closet for use of crews of ships is located at the entrance of and between this dock and another close by, a very objectionable feature. The harbor water in the immediate vicinity is very dirty and left a filthy deposit in the dock when the latter was pumped out. This was cleaned out, but constantly reappeared from leakage through the caisson. The weather was quite cool during the latter part of our stay, and at times the ship was uncomfortable and damp, but it could not under the circumstances be remedied. No fevers were epidemic in Rio at this time. I was told that the number of cases of yellow fever averaged about 30 weekly.

The conditions of dry dock were cheerless and uncomfortable, and during the entire stay general liberty night and day was granted. The men took excellent care of themselves, and not a serious case of any description occurred as a result.

From Rio the ship went to Santos, remaining there four days, and then proceeded to Montevideo, arriving on July 16, after having touched at Desterro, Brazil.

The *Wilmington* left Montevideo on August 17 to join the flagship at Rio, but on the second day out the other shaft broke and she had to make the best of her way back, with the remaining repaired and weakened shaft, to Montevideo, the voyage lasting a week, due chiefly to severe storms encountered.

We arrived at Buenos Ayres, Argentina, September 4, 1899, where the ship now awaits new shafting and repairs. We were in one of the large and beautiful government stone dry docks for a few days shortly after arrival, and all the conditions appeared clean and sanitary.

Very little can be added to what is already known of medical interest concerning Montevideo or Buenos Ayres. The hospital accommodations are excellent, the preferable hospitals for our men being the British at both places.

Buenos Ayres, always a large city, has grown wonderfully the past few years and is now without doubt the largest and most modern city of South America, with an estimated population of over 800,000. The British hospital is large and well appointed. The staff consists of a visiting and resident physician and surgeon and a corps of female trained nurses, some having come out from England; with in addition one male nurse and two assistants for the "special men's ward." There are 120 beds in all. A new ward recently constructed, the "Drysdale ward," is modern and up to date in every detail and is one of the richest and handsomest I have ever seen. The general operating room is as near perfection as can be. A large number of operations of all classes are performed; the operating days being three a week, Tuesdays, Thursdays, and Saturdays, at this season beginning about 8 a. m. The hospital is supported by contributions obtained chiefly from and through the English community. There is no ambulance service, but this is unnecessary. The location is some distance from the center of the city, where there is less crowding and higher ground. For ships lying alongside of the stone docks emergency ambulances can be had upon call, from the "Asistencia Pública" located in the heart of the city and convenient for all hospitals. For ordinary cases an order can be left and an ambulance is sent at any hour with or without a medical attendant. These ambulances are of the best and most improved type. The "Asistencia Pública" has every arrangement for treating emergency cases and out-patients before sent to a hospital. The charges for the service of these ambulances, which carry each two stretcher beds, are $3 for the first hour and $1.50 for each subsequent hour used. They all appear to be kept in perfect condition.

The sanitary conditions of the ship for the past year have been excellent. Her arrangements have proven themselves splendidly adapted to river work. No important changes have been made since my last report.

It is with much pleasure that, after this extensive cruising through tropical waters and unhealthy regions, such a good health report can be forwarded. Our orders were to stop at many places in Brazil and elsewhere to show the flag and cultivate friendly relations, therefore we were obliged to communicate with many places which happened to be not altogether free from yellow fever There have been no epidemics on board. The crew has been instructed in the use of tourniquets and all have been given a chance to practice application at drill.

Since arrival at Buenos Ayres there have been a few cases of diarrhea and colic, due apparently to changes in diet and to fruits. Shore water has been distilled regularly on board for drinking purposes. No water from the basin is used for any purpose on the ship. This was recommended because there is but little current within the docks, and the fact that the many steamers continually arriving from foreign ports must throw considerable refuse overboard, together with the excreta, was in my opinion alone sufficient to condemn the water.

REPORT ON THE U. S. S. CONCORD.

By Ammen Farenholt, *Passed Assistant Surgeon, United States Navy.*

SUMMARY OF CRUISE.

During the entire year this vessel has been attached to the Asiatic Squadron, and has, with the single exception of nine days spent in Hongkong for the purpose of docking, remained in Philippine waters. The range of latitude has included nearly all the possible variation permitted in the archipelago, 9 to 22 degrees north, and the ports of Manila, Iliolo, Cebu, Aparri, and Lingayen bay have divided the greater part of our time. The total distance cruised was 7,572 miles; days in port, 317, and days at sea, 48.

CLIMATOLOGY.

The climate of the Philippine Islands in its relation to the force afloat, while not as salubrious as that of temperate latitudes, is not as severe as one is frequently led to suppose. The climate of any country where the mean annual temperature is 80° F., the coolest month averaging 77°, and the average relative humidity 78, must leave a great deal to be desired by those who have been accustomed to more favorable surroundings, but on account of the peculiar conditions obtaining afloat many of the unfavorable elements are not met with, or met with in such a modified form that much of their malignancy is lost.

The facts that we have always unquestionable water for drinking, suitable food well prepared, and that it is rarely necessary to perform severe physical exercise while exposed to the heat of the sun, renders the climate far less injurious for us than for those not so guarded, the vast majority of diseases here coming from neglect of these points. The mean yearly temperature at Manila is 80° F.; that of the warmest month, May, 84°, and that of the coolest, January, 77°. The average yearly rainfall is 75 inches, being greatest in September, 15, and least in February, 0.47. The average relative humidity is 78 per cent, the extremes being 85 per cent in September and 70 per cent in April. While these records pertain to Manila, they apply quite closely to the seacoast of the entire archipelago. On this vessel the yearly temperature taken on the spar deck under the poop was 81.3° F., that of the warmest month, June, being 84°, and the coolest, January, 79°.

In this connection it may be interesting to note that in the neighboring colony of Hongkong the temperature for the last five years has averaged 71.3° F. The average in Honolulu is 73.5°, and in San Francisco 57°. Under these conditions the health of the crew of this ship has been as good as could be expected, and while many are debilitated, and a more or less protracted visit to some northern port is greatly to be desired, I can not see that the months passed here have occasioned more than a slight diminution in the vessel's efficiency or deterioration in the health of the crew.

HEALTH OF THE CREW.

The average complement of this vessel has been 187, which is slightly less than we are entitled to have. The following table, condensed from the quarterly reports, shows the prevailing affections:

Diseases.	Remaining from previous year.	Admitted.	Readmitted.	Discharged to duty.	Transferred to hospital.	Died.	Continued to next year.	Sick days.
General infections		26		22	2	1	1	158
Disorders nervous system		5	1	5	1			42
Disorders visual apparatus	1	2	1	4				26
Disorders digestive apparatus	2	12		14				90
Disorders circulatory apparatus		4	1	4	1			81
Disorders respiratory apparatus	1	17		17	1			106
Disorders motory apparatus		2		2				7
Disorders cutaneous apparatus		14	2	16				74
Disorders genito-urinary apparatus	1	25	2	26	1		1	380
Injuries		24		18	1	4	1	154
Poisons		2		2				2
Corpora extranea		2		2				6
Total	5	135	7	132	7	5	3	1,126

Of the prevailing affections genito-urinary disorders head the list, claiming 20 per cent of the admissions and 28 per cent of the total sick days, which was due chiefly to indiscretions while liberty was given the crew in Hongkong and Manila. The majority of the venereal cases were of chancroidal origin and yielded readily to treatment, as did also the few mild cases of specific infection. Nineteen per cent of admissions were of general infectious diseases, comprising chiefly malarial disorders and dengue. The former supplied 13 admissions, and all cases except 1 were of a mild remittent type, far less severe than cases often met ashore.

Dengue, presenting mild and often indefinite characteristics, accounted for 8 admissions.

Seventeen per cent of admissions were injuries. Although a little greater than would be expected, these are to be accounted for by the activity of this vessel, and were increased to a small extent by several gunshot wounds received in action.

Respiratory diseases accounted for 13 per cent of admissions, and only 2 cases were caused by the tubercle bacillus.

Disorders of the digestive apparatus gave but 10 per cent, with no severe case.

The total number of deaths was 5, of which 4 were the results of gunshot wounds and 1 caused by a fall from a window of a hotel in Hongkong. Seven patients were transferred to naval hospitals; 5 to Cavite, P. I., and 2 to Mare Island.

There have been 167 persons vaccinated, with 14.37 per cent of success, although freshly bought Saigon virus was used, and every precaution taken to obtain good results.

While in Hongkong one of the crew fell from the balcony of a hotel, a distance of about 35 feet, and was found dead a few hours later where he had fallen. A post-mortem examination revealed the following conditions: Upon the forehead over the outer angle of the right eye were two lacerated and contused wounds, each about the size of a 10-cent piece. The bone was intact beneath these injuries. There was a compound comminuted fracture of the left parietal bone, with much laceration of the overlying parts and evidence of much hemorrhage. There was severe laceration of the brain substance. On the left side posteriorly there was found a considerable rupture of lung substance, with small hemorrhage into the pleural sac. No wounds corresponding on surface of body. The abdominal contents were normal, except a partial rupture of liver substance. The left thigh was fractured transversely at the junction of middle and upper thirds. Special organs showed no pathological changes.

On October 16 the gunboat *Mariveles*, while engaged with the enemy near Iloilo, had 3 men wounded, 2 fatally. These cases came under the jurisdiction of this vessel. Two of these cases are worthy of mention.

A landsman, 22 years of age, while in the act of firing his rifle, was shot, probably by a .45-caliber Remington ball, the wound involving both thoracic and abdominal cavities. He lived for nine hours, perfectly conscious, suffering only moderate pain, but paralyzed below the twelfth dorsal vertebra. The following conditions were found after death: Wound of entrance in axillary line at eighth rib and that of exit 2 inches to the right of median line of back and opposite the last dorsal vertebra. On section the abdomen and pleural sac of left side were found to contain considerable blood. Bullet in entering gouged away a portion of eighth left rib and immediately perforated diaphragm without injury to lung. Continuing, it lacerated the upper portion of the spleen near its center and entered the stomach at about the center of the greater curvature. Emerging in the lesser curvature, it lacerated extensively the head of the pancreas, impinged upon and glanced backward from the eleventh dorsal vertebra, fractured its body, transverse, articular, and spinous processes with those of the adjoining vertebræ, opened the spinal canal, lacerated the cord, and emerged as noted. The wound of entrance in this case was round and clear-cut, being 1½ cm. in diameter, while that of exit was gouged out and ragged, and fully 2½ cm. across.

In the same engagement an apprentice, 18 years of age, was wounded by a Mauser ball, which passed directly through the body just below the brim of true pelvis. When seen several hours later he was in fair condition and removed directly to the United States Army hospital at Iloilo, where, after a consultation, it was decided best not to operate. The patient rallied well, and notwithstanding the obvious fact that the rectum had been perforated continued to do well for ten days, exhibiting no signs of peritonitis or hemorrhage. Suddenly, on the night of the eleventh day, he had a severe hemorrhage from the posterior wound, from which he reacted but partially under transfusion of normal saline solution and other nonoperative measures, only to succumb the following day to another uncontrollable secondary hemorrhage. The following is the report of the necropsy: The wound of entrance was on the right side through the body of the pubes, just external to the pubic spine; it was of a drilled nature and but slightly larger than the diameter of the 8-mm. ball itself. The wound of exit was on the same side 3 cm. inside of a point midway on a line from the posterior superior spine of the ilium to the tuber ischii, the ball passing out through the greater sacro-sciatic foramen; this wound was 1½ cm. in diameter. The rectum was perforated laterally with considerable loss of substance; the peritoneal cavity was not involved. A cavity corresponding to the path of the bullet was filled with blood clots and fæces, and walled off above by thickened peritoneum which was adherent to the abdominal parietes. The bladder was displaced to the left and bound down by adhesions; the caput coli, ascending colon, and sigmoid flexure were surrounded by adhesions, binding them to the abdominal walls and to adjacent structures. The cause of death was secondary hemorrhage from branches of the internal iliac artery.

An oiler, 37 years of age, became ill with pneumonia on a mail steamer while en route to join his vessel in a southern port and was transferred to the army hospital at Iloilo for treatment. The disease followed a severe course, and the patient died on the sixteenth day, an autopsy verifying the diagnosis of unresolved, double-lobar pneumonia, with abscess of right lung.

MEDICAL DEPARTMENT.

This vessel is fortunate in using the junior officers' quarters as a sick bay. This, however, should be permanently allotted as such, especially as ships of this class will probably never again carry junior officers, and certain minor changes made which would increase its comfort and efficiency. The space is ample, in as cool and quiet a part of the ship as possible, and fairly easy of access. An excellent storeroom is also made by utilizing the space within the 6-inch gun support, which passes through the sick bay. The wardroom mess room is used as the station in battle; it is an excellent position considering that in the few engagements with Filipino insurgents it has only been necessary to choose a spot protected from small-arm fire, and the size, light, and accessibility especially recommend it.

The fore hold, marines' alcoves, and present sick bay are open to numerous and obvious objections, and the station now used seems the best choice.

It has been the custom on this vessel to carry the wounded on boards, one provided for each pair of 6-inch guns. They are 7 feet long and 20 inches wide, being provided with broad canvas straps, which lace over the chest and thighs and openings for the convenience of the bearers. This provides a stiff and compact support for the body, easily handled down ladders and gangways, and from actual experience I have found it an excellent method for the transportation of wounded on board ship.

Two other cots, a Wells' and a light affair consisting of two ash poles thrust through pockets formed by doubling over and sewing the sides of a hammock, have been repeatedly used as occasion required.

FOOD, WATER, AND CLOTHING.

The food supplied to the men has been excellent, both in Cavite and Iloilo, where the vessel has spent probably one-third of her time, and refrigerator ships have supplied ample quantities of frozen beef and mutton of excellent quality, often allowing us also small amounts of ice. The tinned foods have stood the climate fairly well. Considerable trouble, however, has been found with the tinned ham and butter, both frequently being found spoiled.

The water has been wholly supplied by the ship's excellent distilling plant, great care being taken that shore water was limited to use in the boilers, and the men instructed in the importance of care in their choice of drinking water when ashore. As a result, we have had no case of dysentery and but few simple diarrheas.

The customary uniform has given satisfaction. For landing parties the white was found altogether too conspicuous a target, and "blue," with a watch cap, too warm. In fact, at Subig Bay, where our battalion was ashore in action in this uniform, several men were overcome by the heat of the sun, one case resulting in thermic fever, which will probably terminate in insanity. To remedy this there has been obtained for the battalion a uniform exactly similar to that which the United States soldiers wear, consisting of campaign hat, blue shirt, khaki trousers, leggings, and heavy shoes. This has stood the test of experience, as in the several expeditions in which it has been worn it has demonstrated its usefulness.

CONSTRUCTION.

I have very little criticism to make regarding the construction, from a sanitary point of view, of this well-known type of vessel. The ship is cool, quite well ventilated, and not overcrowded—all prime requisites in a tropical climate. The artificial ventilation is by means of two rather feeble exhaust blowers. It would be better were these more powerful and able to run on both exhaust and supply plans.

The officers' closets are badly placed under the topgallant forecastle, and of faulty and insanitary construction. An ice machine could be installed in this ship and would be very acceptable in supplying a more refreshing draft than "monkey water," to preserve meats and provisions, and for occasional use in the sick bay.

Fifteen small gunboats, the largest being of but 200-tons displacement, have been commissioned in these waters. They are manned by small crews, varying from 14 to 28 men, and are scattered throughout the islands.

They are, of course, too small to carry a medical officer, and naturally the necessary attendance is supplied by the first man-of-war they meet. As they do very arduous work and are frequently engaged with the enemy, I think the larger ones at least should be supplied with a hospital steward. These vessels should also be supplied with a regular medical outfit of adequate proportions, that they may be relieved from begging supplies so frequently from larger vessels.

THE HEALTH OF MANILA.

Some interest naturally centers about Manila as the capital of our new eastern possessions, and I have endeavored to find sanitary statistics of interest, which, however, is rather difficult, especially so on account of the inability at present to obtain the correct census, the population varying constantly on account of the military operations. The figures 225,000 and 350,000 are the extremes. The mortality per 1,000 is variously estimated from 30 to 55. I presume the former is nearer the truth. These are civil statistics and do not include the troops quartered in and around the city. Diseases of the intestinal tract cause about 17 per cent of the total number of deaths; tuberculosis, 13 per cent; beri beri, 12 per cent; malarial disorders, 3 per cent, and infantile affections, over 20 per cent. Tetanus, variola, and various fevers, grouped under "calentura," supply quite a large proportion of the remainder. Thus it will be seen that Manila, with its high mortality rate, at least 30 per 1,000, leaves much to be desired. Yellow fever, however, is never met here, and cholera very seldom, notwithstanding the close proximity to the coast of China.

REPORT ON THE U. S. S. RESOLUTE.

By ARTHUR W. DUNBAR, *Passed Assistant Surgeon, United States Navy.*

Since the last sanitary report but little of special interest has occurred in connection with this ship. Until April 29 the ship remained at Havana, moored about 200 yards off the "Machina." The health of the complement of the ship was very good. A number of cases of malarial fever occurred, principally among the marine guard and the crew of the steam launch, whose duties necessitated their being ashore much of the time.

I found the microscope furnished by the bureau of great practical use, enabling an early diagnosis of malarial fevers to be made. The plasmodium was discovered in nearly every case of fever. In those cases in which it was not found the fever subsided in one to two days without the administration of quinine.

The rainy season commenced late, which probably contributed largely to the small number of cases of yellow fever on shore early in the season.

Casa Blanca, a small Spanish settlement on the east side of the harbor, seems to be a constant focus of infection, particularly at the coal docks, where an English steamer, the *North Anglia*, was infected. The infection was probably in rotten wood from an old coal barge, which was broken up and the débris thrown up under the after ports of the steamer, where the captain and his steward were berthed. Both contracted yellow fever, the former dying within thirty-six hours.

Leaving Havana, we proceeded to Hampton Roads, and later to Portsmouth, N. H., and remained there until September 29, undergoing repairs.

Carrying Porto Rican relief stores, received at Philadelphia and New York, we arrived at San Juan, P. R., October 26. The sanitary condition of that place is good.

Dengue was the only disease epidemic. Venereal disease is very common there, and causes a large percentage of sick among the troops. Medical inspection of prostitutes is attempted, but is inefficient.

We arrived at Santiago de Cuba on November 7 and found the yellow-fever epidemic about over, there being but two cases, both convalescent.

Arriving at New York on November 24, orders were received to go to League Island to go out of commission.

The *Resolute* has proved to be an unsatisfactory sea boat, as when heavily laden and in a seaway there are but few aboard who escape nausea marina. While well suited for a warm climate, the ship is not sufficiently heated for cold weather.

In conclusion, I wish to call attention to the deficient physique of many men enlisted as coal passers, but unable to endure the arduous duties of that rating. On a regular man-of-war, with a full complement, these men can be given some light duty, but on a ship like this, with a limited crew, the loss of the services of one or two men seriously cripples the engineers' department.

REPORT ON THE U. S. S. MACHIAS.

By THEODORE W. RICHARDS, *Passed Assistant Surgeon, United States Navy.*

On January 1, 1899, this vessel was at the navy-yard, Portsmouth, N. H., whence she sailed on the 15th of the month for Havana, Cuba, stopping two days en route at New York. Since that time some nine months have been spent in and about the Caribbean Sea, to which we have recently returned after about two months and a half in the United States.

At the time of our visit to Havana smallpox was somewhat prevalent, and as a precautionary measure a large majority of the ship's company was vaccinated. After a short stay in that port the ship proceeded to Puerto Cortez, Honduras, where she remained six weeks. The town consists of a straggling collection of huts and houses, and is supposed to have about 1,500 inhabitants, including a considerable number of Americans, as this is a terminus of an American railroad. The town is necessarily strung out along the harbor, as there is a large brackish marsh and lagoon a few rods back of the beach. Cases of malarial fever are, of course, frequent and severe, hematuria being a not uncommon complication. A sailor aboard a merchantman in the harbor died shortly after our arrival from this cause, but we had no cases of malaria traceable to our stay in this port. Fresh beef, of poor quality, could usually be obtained for the crew, but vegetables were very scarce.

After leaving Honduras our Southern cruising was confined almost entirely to the islands of Cuba, Santo Domingo, and Porto Rico.

So far as could be ascertained, we were never in a port during the prevalence of yellow fever, but owing to the probability of sporadic cases the usual precautionary measures, short of absolute quarantine, were adopted in all ports except San Juan, P. R. San Juan is said to bear a most unenviable reputation for venereal disease, but the only evil results from our frequent visits were a few mild cases of gonorrhea. Liberty having been necessarily much restricted elsewhere, from various causes, the opportunities for infection were doubtless great while at this place.

At Nuevitas, Cuba, yellow fever was epidemic late in the summer, but had not appeared when we were there in May. Gibara, Cuba, which was most unhealthful in 1898, has since greatly improved in this respect. At the date of our departure, September 14, the town had been free from smallpox for many months, and no recognized cases of yellow fever had occurred during the year. A building said to have been used as a smallpox hospital had been burned down. The municipal hospital apparently leaves everything to be desired, judged by American standards.

Three ports in Santo Domingo were visited—Santo Domingo city, San Pedro de Macoris, and Puerto Plata. Except at Puerto Plata, there is no harbor, ships lying in the open roadstead, and at Macoris we were forced to put to sea to ride out the hurricane of August 9. August appears to be the height of the rainy season, and the heat and humidity were extreme. Curiously enough, conditions are reversed at Puerto Plata, rain being most frequent in winter. This condition is undoubtedly due to purely local causes, as the country a few miles in the interior seemed very dry during our stay in December.

The general health of the ship's company, for the period embraced in this report, compares favorably with that of previous years. While there were 114 admissions, against 101 for 1898, 10 of these were for vaccina, resulting from compulsory vaccination. About 15 per cent of the total number of cases were of venereal origin. Malarial fevers (including the remittent and intermittent forms) were extremely mild, giving but 7 admissions, with a total of only 25 sick days. None of these cases were recurrent. One death occurred during the year due to typhoid fever. This case developed at sea, bound for Honduras, in a patient under treatment for secondary syphilis of severe form, this disease having already greatly undermined his constitution. It was necessary to keep him aboard ship, under most unfavorable conditions for so serious a case, for seven weeks, when we touched at Cienfuegos, Cuba. There, through the courtesy of the army medical authorities, he was transferred to a regimental hospital, where his death ultimately occurred from asthenia.

The only accident resulting seriously was a case of hernia following a slight fall on a boat boom. The patient was transferred to the sick quarters of the United States naval station at San Juan.

No important changes have been made in the ship herself, affecting her sanitary condition, since my last report. An additional flushing system has been added to the wardroom water-closets, but their design is not altogether satisfactory and it is found almost impossible to keep them from leaking. As the closets are situated on the after end of the berth deck, adjoining the wardroom country, this is a serious defect, as tending to pollute the atmosphere of a living space always difficult to ventilate at sea.

Mention has already been made of the embarrassments arising from the lack of a sick bay and the crowded condition of the berth deck, and it is hoped that some practicable remedy may be found before the ship is again commissioned. It seems probable that the changes required could be made without great difficulty or expense.

REPORT ON THE U. S. S. IRIS.

By DANIEL H. MORGAN, *Assistant Surgeon, United States Navy.*

The *Iris* is constructed on the plan of freight vessels, and was formerly in the merchant service of the United States, plying between Galveston, Tex., and Havana, Cuba. The officers' quarters are located aft, and, for a vessel of this type, are remarkably comfortable and well ventilated. The men's quarters are located forward, on the berth deck. This compartment has five air ports on each side, and is further provided with a wind sail, thus having the advantage of excellent natural ventilation. Although this compartment compares favorably with similar quarters on other vessels of the Navy, yet it has not sufficient space to accommodate the entire crew, and some of the men are compelled to swing their hammocks beneath the forecastle and forward part of the evaporator room, the latter space not being desirable at sea.

The officers' and men's water-closets are located amidships, and are provided with an excellent flushing system. In view of the fact that the men's closets, when located beneath the forecastle, so frequently prove to be a menace to the health of the crew, this location possesses a decided advantage.

The vessel is ventilated by means of shafts and wind sails, the system being similar to that usually adopted aboard vessels of this class. The temperature in the engine and fire rooms has never been excessive, averaging in the former 97.4° F., and in the latter 100° F.

The officers and the crew have been vaccinated with Saigon virus, the percentage of success being about 3. The general health of the officers and men of the vessel, barring the enervating effects of the tropical climate, has been very good.

The following ports have been visited by this vessel during the past year: Honolulu, H. I.; Guam, Ladrone Islands; Manila, Iloilo, Cebu, and Zamboanga, P. I.; Jolo, Sulu Islands, and Hongkong, China.

The following facts concerning the diseases prevailing in the principal ports visited during the year are based upon my own experience and upon information which I have obtained from medical officers attached to shore stations:

Honolulu, H. I., the first port visited, was found to be comparatively healthful. According to records which I have consulted, leprosy made its appearance in the Hawaiian Islands in 1853 and was probably introduced from China. Since its introduction it has claimed about 4,000 victims, but seldom attacks the whites. The disease occasionally makes its appearance in Honolulu, but as soon as it is discovered the patient is immediately sent to Molokai Island, the Government having founded a leper settlement there in 1865 and begun segregation in 1866. The site selected is located about 50 miles from Honolulu and comprises an area of about 5,000 acres. The settlement is provided with hospitals, churches, a public library, and a lecture and concert hall. The patients are afforded various kinds of amusement, including horse racing, the latter sport being particularly popular.

According to the history of leprosy in the Hawaiian Islands, the disease seems to be but slightly contagious, and there are instances recorded where native women have married, their husbands contracting the disease and some of them dying from its effects, with no trace of the disease in the women. Again, there are numerous instances where children have been born of leprous parents but have not developed the disease. Since the act segregating them has been passed the number of lepers has been gradually decreasing.

During our visit at Hongkong, China, which covered a period of about three weeks, dysentery and malaria were prevalent. Bubonic plague made its appearance in sporadic form in Hongkong during the two weeks ending December 9, 1899.

In regard to the diseases prevailing in the Philippine Islands, I respectfully submit the following summary, naming the most important diseases in the order of their development and referring particularly to the ports of Manila, Iloilo, and Cebu:

(1) Dengue is prevalent throughout the year; (2) gastric and ther-

mic fever, more commonly known as tropical fever, is more prevalent during the months of March, April, and May; (3) dysentery prevails particularly in June and July; (4) beriberi is prevalent among the natives at nearly all times, the unusual number of cases being due to the peculiar circumstances occasioned by the war; (5) gastroenteritis is of frequent occurrence and incident to climatic conditions; (6) smallpox is common at any season of the year, but perhaps more particularly so during December, January, and February; (7) malaria is prevalent during the rainy season; (8) tuberculosis is common at all times; (9) typhoid fever occasionally develops in sporadic form at any season of the year. Skin diseases, including itch, impetigo, and eczema, are very common.

Among diseases peculiar to the Philippine Islands attention is called to a form of adenitis inguinalis, nonvenereal in origin. This disease occasionally develops aboard ship, and no definite cause has yet been assigned. Leprosy also prevails among the natives, but my experience concerning this disease is principally confined to the island of Cebu. During my first visit to the port of Cebu numbers of cases could be seen about the streets, apparently no attempt having been made to segregate them. Upon inquiring I was informed that the Spanish authorities allowed the lepers the freedom of the port directly after the sovereignty of the United States was established over the Philippines. Recently I have learned that the United States Army has taken steps to prevent the spread of the disease and that all cases of leprosy have been segregated in an establishment for that purpose.

In submitting my report upon the sanitary condition of the vessel and of the ports visited I deem it highly important that the general climatic conditions of the Philippine Islands should receive due consideration.

The Philippine Archipelago is situated in the tropical zone, and its climate is characteristic of countries so situated. Three well-marked seasons are noted during the year: The first is warm and dry and generally includes the months of December, January, and February; the second is very hot and dry and includes the months of March, April, May, and part of June, and the third, warm and wet, generally embraces the months of June to November, inclusive. On the eastern coast there is a variation in the seasons owing to the great rainfall during the months of December, January, and February, occasioned by the north winds. The average temperature of the archipelago at the sea level varies from about 80° F. to 98° F., the latter being considered the maximum temperature.

The atmospheric pressure in the entire group is very steady, and, indeed, the barometer may be said to act like a clock. The highest pressures are registered during the months of December, January, and February, frequently reaching 766 millimeters, and the lowest are noted during April and May, the pressure registering about 757 millimeters. This range, of course, does not include those incident to violent atmospheric changes.

The annual average evaporation is about 6 millimeters per diem. The maximum evaporation occurs during the months of March, April, and May, the amount of water evaporated varying from about 9 to 10 millimeters per day; the minimum evaporation occurs during the months of July, August, September, and October, when the precipitation is abundant.

There are two prevailing winds in the archipelago, called monsoons, one from the northeast and the other from the southwest. The northeast monsoon prevails from December to February, and the southwest monsoon from June to August. During the rest of the year the winds are variable.

Cyclones and hurricanes are frequent during the period of change of prevailing winds, and are doubtless due to changes in the maximum and minimum centers of atmospheric pressure and conflict of winds from both centers, the movement being rotatory as well as horizontal.

Having considered the general climatic conditions of the Philippine Archipelago, I deem it vitally important to offer some information relating to the effects of the climate upon foreigners. The foreigner coming here and expecting to make his home in these latitudes must accustom himself to methods of living entirely different from those to which he has been subject in his former home unless he is to succumb to the effects of his new environment. In this connection I particularly refer to Europeans and Americans.

During the cruise in these islands there has been ample opportunity to observe the effects of the climate upon the officers and men of the United States Navy, and experience justifies one in offering an opinion relating thereto. Consultations with medical officers attached to other vessels of the Navy have confirmed the opinion that the inherent climatic conditions of the Philippine Islands can not fail to weaken and enervate the human system. This effect may not be so evident during the first year, but as a rule makes itself very manifest during the second year.

In view of this reduced condition of the vital powers, a person is naturally more liable to be attacked by the diseases prevailing in these latitudes, and, in support of this opinion, attention is called to the number of medical surveys that have been held on this station. Nature in her wisdom has provided all places on the globe with means adequate to the requirements of the beings occupying them, but it is not believed that it is possible for foreigners in general to adapt themselves to their new surroundings.

In view of all these facts, the problem naturally arises, How can serious injury to the health of the officers and men of the Navy serving on this station be avoided? The problem can easily be solved by reducing the cruise to eighteen months, and it can be stated that this solution meets with the approval of other medical officers with whom consultation has been had.

In concluding this report it is earnestly recommended to the Department that the climatic conditions of our newly acquired possessions in the Far East receive mature consideration, and that in accordance with the opinion as expressed above the term of service on the Asiatic Station be reduced as soon as practicable.

REPORT ON THE U. S. S. BENNINGTON.

By DANIEL G. BEEBE, *Assistant Surgeon, United States Navy.*

During the past year the *Bennington* has been ninety-one days at sea, and two hundred and seventy-four days in port. In January, 1899, we left Honolulu, H. I., for the Asiatic Station, arriving at Manila February 22, after a stay of twenty-three days at the island of Guam.

VENTILATION.

This ship is almost entirely dependent on natural means for its ventilation. The artificial exhaust system has never been equal to the conditions that obtain on board. The air pipes are all too small, have too many angles, while the blowers are very weak and the power used in running them insufficient.

The natural ventilation is not of the best, and in the fire and engine rooms where it is most needed it is poor. This is due to the arrangement of the ventilators. Air is supposed to be provided to the fire rooms through four iron ventilators, viz, two forward of and below the bridge and two aft of the bridge. The forward pair are much too small and conduct the air into a large air box into which also discharge the two ventilators aft of the bridge. From this air box the forward fire room is supplied by two pipes. The after fire room has a better supply of fresh air, from two iron ventilators that lead directly into it.

In regard to an improvement in the air supply of the forward fire room, the following is suggested: A telescopic arrangement of the two after ventilators which would permit of their being elevated above the bridge and pilot house, those structures at present rendering the ventilators almost useless, and increasing the size of the two forward ventilators below the bridge, with all four ventilators discharging directly into the fire rooms. This would ventilate the fire rooms in a satisfactory manner and materially increase the efficiency of the men employed there.

The engine room has two iron ventilators, but is supplied with fresh air chiefly by two wind sails which lead indirectly through the large engine-room hatch into the engine room. The heated air of these spaces can not freely escape, nor can fresh air penetrate as it should through the large engine-room hatch owing to the fact that a solid platform for the stowing of lumber has been built at a height of about 3 feet directly above it. Furthermore, there is a large sailing launch on either side, together with rigging, sails, and oars, which makes the obstruction nearly complete. This condition of the engine and fire rooms is deplorable, particularly in a ship on duty in tropical waters, and should be corrected at the earliest possible moment.

During pleasant weather the crew are permitted to sleep on deck under an awning, but in disagreeable weather they are for the most part obliged to sleep on the forward berth deck or in the two side passages. The ventilation in these spaces is practically nil, being almost entirely dependent upon the artificial exhaust system spoken of above. In the forward berth-deck compartment fresh air is supplied by a single wind sail, and the foul air finds its own way out at a very slow rate. The exhaust system has but the feeblest influence upon the air there. The engineer's force in bad weather sleep in the two wing passages where the air is but little cooler and not any fresher than it is in the fire rooms below.

The after part of the ship is fairly well ventilated by means of the large hatches over the wardroom and cabin and by a large wind sail leading through a skylight into the wardroom country below.

I recommend that changes be made at the earliest opportunity in the natural and artificial systems of ventilation in this ship, with the object of improving the atmospheric conditions which now exist in the engine and fire rooms and in the crew's quarters on the berth deck.

THE SICK BAY.

The space at present occupied as a sick bay was formerly the junior officers' quarters, that which was originally set apart as a dispensary having been altogether too small, and, except when artificially lighted, too dark for the purposes intended. Formerly no provision was made for a separate space for the sick, but they swung in hammocks in the hottest and noisiest part of the forward berth deck. Under such conditions it was difficult to give the necessary aid and attention, and a careful physical examination was impossible. The present sick bay is of fair size, with a good light and natural ventilation. For the sick there are three bunks, and if necessary two hammocks may be swung. There is also a transom, and the storage room is ample and dry. It is to be recommended that the space now occupied as a sick bay be definitely and finally assigned for that purpose.

CLOSETS.

The officers' water-closets, two in number, and a urinal, are usually clean and free from odor. However, the bowls are of an old type with a rough surface, and the water flushing them has no great force, so that, unless carefully attended to, they would soon become foul. A more recent style of bowl is to be recommended. There are two closets for the men, one on each side of the main deck, well forward. Each consists of a rough iron trough with 3 seats. At the after end of each trough is a urinal. The troughs and urinals are well flushed by the discharge water from the distiller. But the flushing water is nearly always at the boiling point and makes the temperature in both heads excessive, and at times almost unbearable. At sea the port holes, two in number, are necessarily closed and the ventilation is very poor.

The providing of cooler, fresher air to the "heads" is urgently needed.

THE STOREROOMS AND BILGES.

The storerooms and bilges are well kept, dry, and clean.

FOOD.

Considering the nature of the duty to which this ship has been assigned, e. g., as station ship in Lingayen Gulf, and at Cebu, and in extensive cruising among the islands, the food has been good. The opportunities for obtaining fresh provisions in the islands are as yet limited. In Manila alone can they be obtained in quantities and of the proper varieties. In such places as Zamboanga, Iloilo, and Cebu, fish, fruit, and a limited variety of vegetables are obtainable. The beef to be had in these places is of a fair quality, but not so good, or so cheap, as that obtained from the United States or Australia. The main faults to be found with the local beef is that it is poorly fed, and must be eaten the same day that it is killed.

It is desirable for a small cold-storage plant to be installed where station ships are kept, or in case this be not feasible, that ships be regularly supplied with beef from storage ships, and also with the means to keep the necessary amount of ice to preserve it. A small ice plant on board this ship would add greatly to the comfort and health of all.

WATER.

The distilling plant has a daily capacity of about 1,700 gallons. Since the arrival of the *Bennington* on the Asiatic station no shore water has been used either for drinking or cooking purposes. The quality of the water furnished by the distiller is of the best. Its consumption in large quantities has in no case been followed by injurious results. The water to be obtained on shore in these islands may be good, but it is always open to suspicion. The cases of dysentery and of typhoid fever were, I believe, traceable to the drinking of shore water by the men while on shore.

LIGHTING.

The electric lights furnish good and sufficient light. I would recommend that ground-glass globes be furnished, as being less injurious to eyes.

SUMMARY OF CRUISE.

With the exception of three trips to Hongkong, this ship has been the entire year among the islands of the Philippine Archipelago. During this time the ship has been throughout the group, from the Camiguin Islands in the north to as far south as Borneo. From July 1 until September 8 the *Bennington* was stationed at Cebu, and from October 3 until November 9 she was stationed in Lingayen Gulf, Luzon, and from November 26 until January 1, 1900, again at Cebu. The entire year has been passed in the Tropics.

In this part of the world there are two seasons—the wet and the dry. The wet season is the acme of the disagreeable. There is a daily heavy rainfall, and occasionally for several days together there is a continuous downpour. As much as 23 inches of water have fallen in three days. Consequently the air is surcharged with moisture. The temperature during the wet season is for the most part warm, but subject to sudden changes, becoming at times fairly chilly. For the entire year the temperature here will average 80° F.

The dry season is not well named, for showers may come at any time, even quite heavy rains. From November until April—the dry season—rains are far less frequent than in other months. This is particularly true of Manila Bay, the climate of that locality being influenced by the slightest atmospheric disturbance in the China Sea.

During the rainy season the men suffered greatly from being unprovided with rain clothes. This was due to the fact that no provision was made on board for the proper stowage of oilskins and such articles, each man being supposed to care for his own. The consequence was that most of the oilskins were spoiled by being tightly rolled and placed in clothes bags, which were stowed in the hotter spaces of the ship. The improvident among the crew found the rain clothes in the way during the dry season and either traded or threw them away. When the last rainy season came on few men were properly equipped to meet it. Some space on board set apart where the rain clothes of the crew can be hung up and kept in good condition, ready for use in any season, is much to be desired.

Exposure to the sun in these latitudes is a well-known dangerous factor. I consider the present service hat an insufficient protection, and recommend that a straw hat which will protect the head and neck be made part of the uniform equipment on this station. Although an extremely high temperature either in the wet or dry season is rarely seen here, no climate that averages 80° F., with the air heavily saturated with moisture, can be other than exhausting and depressing in the extreme, particularly to those unused to it. This, with hard and constant service, weakens and debilitates the men to a marked degree.

Where it is necessary for a ship to remain so long in the Tropics as the *Bennington* has, it is to be recommended for the health, comfort, and efficiency of all that some relief be given if possible. This might be done by giving to each ship in succession a short tour of duty outside the Tropics in the neighboring waters of China or Japan. If this could be done it would promote the general welfare and health.

Of the many places visited by the *Bennington*, the best from the standpoint of climate is undoubtedly Cebu. Although it is considerably nearer the equator than Manila, it is slightly cooler, and at no time is there such a saturation of the air with moisture. The town of Cebu and vicinity has a population of about 30,000 people, of whom but a small number are Europeans. The country directly back of Cebu is very fertile and rises rapidly to the high hills which form the central ridge of the island. It is thus naturally well drained. The highland has a cool and invigorating air which is in most pleasant contrast with that of the lower levels. Cebu has no malaria. The cases received at the army hospital here have without exception come from other islands, particularly Panay. Indeed, the calentura, thermic, or simple continued fevers, which are so common elsewhere, particularly at Cavite, are but little known here. However, variola is endemic, and the place has been the source of eight cases in the army and one case on the U. S. S. *Monadnock*. Of the nine cases, five were fatal. This is entirely due to the fact that there has never been the slightest effort toward a sanitary control of the district.

The soldiers and sailors on the station, and particularly those at Cebu, have been vaccinated and revaccinated many times. Vaccination protects to a high degree, but does not confer absolute immunity. It must be general and repeated to be effective. In Manila and the surrounding country vaccination was forced upon the native population. Where a death rate of 200 a month had formerly been considered not unusual, it was, owing to such measures, lowered to less than 50.

In these islands a frequent liberty is necessary to the general welfare and health of the men. In Cebu the men are entirely free in their movements throughout the town and immediate vicinity, and are no doubt repeatedly in contact with disease. Smallpox is not confined to any one district here, so that an attempt to restrict the men would result finally in confining them to ship or barracks. There is some leprosy in the island. Formerly the 30 or 40 cases in and about Cebu were segregated. This is now no longer the case. However, within the last three months the lepers have not been so frequently seen in Cebu. Care and maintenance of these unfortunate individuals would cost but a nominal sum.

Endemic multiple neuritis, beri-beri, is very prevalent throughout the islands, and Cebu is no exception. Here, as is usual elsewhere, the disease is confined to the poorer classes. During the past year the disease has been prevalent in the form of an epidemic. The natives here ascribe its presence to the quality of rice they have had, and have migrated in considerable numbers to the island of Negros, where the disease is less in evidence and the food is of a better quality.

Owing to the closing and blockade of the many little island ports where formerly rice was obtained, the natives were obliged to get some of their rice from Saigon, China, and this they claim was of an inferior quality.

In Cebu there is a small civil hospital which is in charge of the Sisters of Charity. Both natives and Europeans are here cared for. It is a light, airy place, having room for about 10 beds. It is kept exceptionally clean, but, as might be expected, it has no modern conveniences. The charge for bed and attendance is $1 a day.

The United States Army hospital occupies a large building, formerly a convent. It has no modern conveniences, but is dry, light, and well ventilated. This hospital has its 60 beds filled at present. Its advantages have been very kindly extended to the navy.

RECORD OF HEALTH.

The health of the officers and crew has been good in spite of hard and constant service under, at times, trying conditions.

REPORT ON THE U. S. S. NERO.

By Frank E. McCullough, *Assistant Surgeon, United States Navy.*

The U. S. S. *Nero*, which had been used as a collier during the Spanish-American war, was recommissioned for the purpose of making a Pacific submarine telegraphic survey. The ship was fitted with a Sigsbee and a Thompson sounding machine, together with the most modern appliances used in deep-sea soundings, and a commercial electric plant with a single dynamo. The latter was limited to night use. Her coal holds allowed the carrying of over 3,500 tons of coal, a sine qua non in an expedition of this character, where many days must be spent between ports and coaling stations. No means of preserving food was supplied.

Commissioned on April 10, 1899, at the Mare Island Navy-Yard, she proceeded to sea on April 22 and, after a brief stay in Honolulu, commenced the survey in the beginning of May.

The islands known as the Midway group were reached on May 23. They are situated in latitude 28° 12′ north and longitude 177° 22′ west. Captain Brooks, of the *Gambia*, discovered the group in 1859 and took possession of them for the United States. The larger of the two islands which comprise the group is known as Sand Island. It is an irregularly pyriform atoll, entirely surrounded by a barrier reef, complete except at two points, both of which are sufficiently wide to permit approach to the sand beach. It is about 2½ miles long and varies from one-half to 2½ miles in breadth, its widest part pointing to the southwest. Between the barrier and the beach is a lagoon which fairly surrounds all the island bordering on the ocean and fully 1½ miles wide at its greatest breadth. Within it great masses of coral project above the surface at various points. The varieties of coral which have entered into the formation of the island and which still exist in the lagoon are meandriniform and perforate madrepores, millipores, and seriatapores, notably the *Madrepora cervicornis* and the *Madrepora porifera*. Practically all the coral on the island has undergone thorough disintegration, existing now as a sand of medium coarseness and so bleached as to be extremely trying to the eyes. It reflects the heat of the sun and scorches the face. In the central and eastern portion of the island extensive calcareous incrustations cover the island, forming a stratum of about one-third of an inch in thickness. The soil of the entire island is extremely porous, and toward the central portion, which is also the lowest, numerous subterranean excavations exist, circular in form, and averaging about 2 feet in diameter and more than a foot in depth. They are evidently of aqueous origin, as no evidence of animal agency could be discovered. The highest portion of the island is about 35 feet above the sea level, of a rolling character, and interspersed with many small dunes. Many pieces of coal left there about thirty years ago by the Pacific Mail Steamship Company now exist as coke from exposure to sun and air. Geologically the island is of very recent elevation, all the fossils on its highest portion belonging to the existing fauna, and the highest point is certainly higher than when reported in 1867, although this may be the result of wind and sea. From the great number of birds with which the island is tenanted a large amount of guano might be expected. Its absence is explained by the porosity of the soil and the frequent rains. But it has, without doubt, been an important factor in permitting such vegetation as does exist on the island. No fresh water is to be seen on the surface, but by digging about 4 feet may be obtained. The sand extends about 18 inches and more in the lower portions of the island and apparently of much greater depths on the elevated areas.

Vegetable life is extremely scanty, with the exception of a hardy shrub varying from 3 to 5 feet in height, which I have not been able to identify, as it was not flowering. This is well distributed over the island, generally occurring in groups of a dozen or more, and attaining its greatest height on the higher portions of the sand dunes. Besides this a scrub grass and dwarfed members of the purslane, bindweed, lobelia, and figwort families and a species of turnip, the Japanese daikon, are sparsely distributed. The scarcity of vegetation is probably due to the prevailing seas and winds coming from the northwest coast of North America, and such vegetation as might chance to be drifted over so many miles of ocean would not find a congenial soil here for its reproduction.

The keel and other fragments of several vessels lie on the beach about half a mile from the harbor entrance, and, judging from their honeycombed and weatherworn condition, must have remained there a number of years. On the highest portion of the island (the northern), and not more than 30 yards from the beach, a one-room house was constructed by the Pacific Mail Steamship Company many years ago, at a time when they intended using the island as a coaling station. A placard within announces that the writer thereof, the commander of a schooner, had been wrecked on the island in September, 1888, and had remained there until February, 1890; that during that time he had buried four of his crew. He also stated that by digging 4 feet at an indicated point water, "and good water, too," could be obtained. The *Wandering Minstrel*, while surveying for the Hawaiian Government, was also wrecked here soon after, and her captain and crew rescued after a residence of fourteen months. There were also numerous evidences of subsequent occupation by Japanese.

It was near this house that the daikon was growing, and there were a number of the plants to be seen near by. From this I infer that with care and fertilization many vegetables of economic value could be grown.

In 1867 it was reported that on the adjacent Eastern Island about 5 acres of a vegetable mold a foot in depth existed, and it would be well worth transporting a sufficient quantity of it to improve the soil of this part of Sand Island, which I regard as the most suitable for habitation.

Our short stay did not permit obtaining a sample of fresh water, but from the evidence of the merchant captain, whose sole water supply for more than a year must have been from a shallow well (and the excavation is still to be seen), it is highly probable that deeper borings at that point would yield a larger and more palatable supply of water. The principal substances that such water should contain in solution are calcium carbonate and carbon dioxid, which are removable by boiling and filtration.

The number of sea birds on the island is infinite. Our visit was made during the nesting season, and over fully half of the island the sand was literally covered with sea birds. It was quite impossible to cross it without stepping on the nesting birds and their eggs unless precaution was taken to drive them away by means of a shrub branch. The noise of the retreating birds as they hovered overhead, screeching and darting threateningly, was deafening. The young Pacific albatross, fairly grown but with incomplete feathers, refused indeed to retreat and valiantly maintained his ground. The most numerous of these sea birds are the Pacific albatross (*Phœbetria fulginosa*); a species of the Sula commonly known as the booby, a tern (*Sterna sandvidensis*); the "bos'n" or red-billed tropic bird (*Phœthon althereus*), and the frigate or man-of-war bird (*Fregata aquila*). A few land birds, apparently plover, and a sickle-billed curlew were occasionally seen. Of these birds the tern, plover, and curlew are of economic value as food.

In the lagoon and in the shallow waters on the eastern side of the island are great numbers and varieties of valuable food fish, including the cod, perch, mullet, mackerel, and several species of brilliant-colored coryphenidæ (sometimes known as dolphin fish), of rare green, blue, red, and brown tints. Several echinoderms are found in the shallowest waters, and they include the edible bêche-de-mer (*Holothuria edulis*). A great number of univalves and a few edible bivalves, among which is a cockle, are found in the lagoon. On the eastern side of the island I found the skeleton of a large crustacean, evidently a scolloped lobster. There is no evidence of land animals.

During our anchorage near the island (May 23, 1899) the temperature of the air ranged from 67° to 69° F., and that of the surface water about 77° F. The relative humidity was very high, varying from 85° to saturation. The rainfall is probably large and more than sufficient to nourish vegetation. I can see nothing on the island which would be likely to give rise to disease.

As we sounded around the island on our return (January 3, 1900) the atmospheric temperature was from 66° to 67° F., and that of the surface water 66° F. The atmosphere was comparatively dry.

The only building material on the island is the coral sand, from which lime and brick may be made. The shrubs are not sufficiently woody to answer for fuel.

Eastern Island is apparently much more luxuriant in vegetation and would doubtless repay careful investigation.

Port San Luis d'Apra, on the island of Guam, was reached on July 5. During our stay at this port, and later, on three subsequent visits, the rainfall was heavy and the relative humidity in the intervals high.

When about midway between Guam and Luzon fire occurred spontaneously in the coal holds, necessitating returning to Port San Luis d'Apra and the jettisoning of considerable coal. After resuming the voyage the fire recurred when near the island of Luzon, but was not of as dangerous a character as the former outbreak, and Manila Bay was reached without further interruption with the routine work. At Cavite all the coal was turned over and no further combustion occurred during the remainder of the cruise.

The return voyage was spent in developing the main line by traversing it at angles, forming a zigzag line. After leaving Guam a direct line was run to Yokahama, Japan, and a return traverse line to Guam. Much heavy weather was experienced from this time up to the termination of the voyage at Honolulu. Soon after leaving Guam nearly all the cereals became infested with grubs and weevils and so moldy as to be unfit for consumption. The following were in the worst condition: Flour, sea biscuit, sweet crackers, maccaroni, vermicelli, sphagetti, corn meal, oatmeal, and hominy. All but flour were kept in sealed tins. Rice, except for weevils, remained in fairly good condition. Beans were much deteriorated. Hams and all dried meat, except those in tins, became putrescent. There was a large percentage of "swell heads" among the canned meats, especially chicken and turkey. Butter and cheese became extremely rancid. Unsweetened evaporated milk remained uniformly good. Coffee beans were perforated by borers.

The long-continued deprivation of fresh food first manifested itself among the crew and officers by gastric disturbances and anæmia. It was hoped that a liberal diet of fresh food while in Honolulu would correct these difficulties, but on arriving off this city, on January 31, 1900, the information that bubonic plague existed in the port prevented communication with the shore, and on the same day the voyage was resumed toward San Francisco. Two days later several of the crew presented œdema of the lower extremities and, in some instances, of the forearms. Numbness of the lower limbs and profound exhaustion supervened, and shortly after the arrival of the *Nero* in San Francisco, on February 11, where a decided lowering in temperature was experienced, a great majority of the entire crew and officers were suffering from sore mouths and gums, gastric disturbances, and anæmia. After consultation two cases were diagnosed as scurvy and transferred to the Mare Island Naval Hospital. The case of B., an oiler, was pronounced. The first symptoms noted were soreness in the soles of the feet and œdema of the legs. The œdema ascended, involving thighs, scrotum, and abdomen until it amounted almost to general anasarca. The mouth and gums presented numerous small ulcers, and later there was marked dyspnœa, nasal hemorrhages, and purpura. Owing to the inability to heat the ship artificially, there being no steam-heating apparatus, bronchitis and coryza complicated many of the cases of anæmia, and it became necessary to transfer fifteen to the hospital. All these cases improved rapidly soon after admission to the hospital and many were returned to the ship two weeks later. Stoves were procured and the sanitary condition of the ship improved as much as possible, a liberal antiscorbutic diet provided for the crew, and when the ship went out of commission, on March 20, much of the ill effects of the cruise had disappeared.

I consider these cases due to the following: The lack of special apparatus for preserving food; the deterioration of the provisions on the vessel brought about by the combustion in the coal and the constantly high temperature in the storerooms; continued residence in a moist, tropical climate, and the inability to procure fresh provisions in sufficient quantity at Guam, and later, to procure any at Honolulu.

It is respectfully suggested that expeditions in the Tropics necessitating remaining many weeks at sea should be provided with a cold-storage apparatus, an electric plant which will admit of operation during the day as well as night, and that all provisions which are not to be used within two months or kept in cold storage should be kept in carefully sealed tins. Even salted foods, as hams and bacon, should not be excepted.

The trans-Pacific submarine cable survey having been successfully completed the *Nero* was put out of commission on March 20, 1900.

REPORT ON THE U. S. S. VIXEN.

By William H. Bell, *Assistant Surgeon, United States Navy.*

In making a report on the arrangements and fittings of the U. S. S. *Vixen*, as they affect her sanitary condition and the possibilities of caring for the sick, it is considered necessary to go somewhat into detail, as it is believed that no such information concerning this ship is in the possession of the Department.

It is apparent that as a ship of war and as the permanent abode of a much larger complement than she carried before purchased by the Navy Department, these arrangements are inadequate and incomplete in many respects. Much has been done to rectify defects, but there are other alterations considered absolutely necessary for the continued good health of the ship's company. These will be mentioned in the course of this report. Suffice it to say here that some of the insanitary arrangements exist in spite of recommendations for their correction, while others have more recently come to notice and are on the approved request for repairs now in the hands of the construction department at the Norfolk Navy-Yard.

Notwithstanding the foregoing, there has been only one instance of sickness since the ship was taken out of ordinary in the early spring of 1899 which can be attributed to want of hygienic care aboard. This was considered due to certain salt beef and pork that had begun to decompose. The meat was condemned so soon as the fact was discovered, but most of the crew were already suffering as a result of its ingestion, and two were confined to bed for several days. These were the cases of "meat poisoning" or auto-intestinal intoxication reported during the quarter ending September 30, 1899. They are not cited as having a connection with the construction and arrangement of the vessel.

VENTILATION.

The most serious question of hygiene on this ship is that of ventilation, the deficiencies of which, even under the most favorable circumstances, the best conditions of temperature and climate, have been apparent, though without marked deleterious results. Just what the state of health would be under extreme conditions can only be imagined, for experience is lacking; but it is felt that a prolonged period of cold or bad weather, either in port or at sea, requiring every door and hatch to be closed, would develop serious failings and bring about a poisonous vitiation of the air in the living spaces. The *Vixen* is distinctly a fair weather craft and admirably suited for cruising in tropical waters, for in cold weather it becomes impossible to maintain the purity of the air without dangerous drafts.

FIRE ROOM.

The fire room is an exception in point of ventilation, being amply supplied with air at all times by means of two straight air conduits, 2 feet in diameter, leading to the upper deck. This specific provision is aided materially by the through draft in the "drum room," which is situated in the deck house and opens freely out on either side by two doors. These doors can be kept open practically all the time, and much of the hot, foul air is exhausted as it rises or is forced up through the gratings from the fire room, thus perfecting the convection. In fact, the fire room has proved very comfortable, even in warm weather, being actually cooler by 20° than the engine room.

ENGINE ROOM.

The engine room, on the other hand, is miserably ventilated, if it can be said to be ventilated at all, except when the weather admits of using a wind sail. It derives its meager supply of air from two conduits 15 inches in diameter. The port conduit little more than penetrates the upper deck and is practically useless, as failing utterly to carry any air below. This is also true of the one on the starboard side, which takes practically three right-angle turns in getting to the engine room proper.

LIVING SPACES.

The crew's living space is insufficiently ventilated by two air shafts placed on the extreme forward part of the main deck. These do very well in fair weather at sea, or in port when the air ports can be opened and air scoops used as supplementary ventilating facilities, but in heavy weather at sea the water, coming over the bow, enters these shafts, wetting everything and making it necessary to put the only berth-deck ventilators out of commission. And in cold weather to have these ventilators trimmed for the proper performance of their function, and the hatch open, means that many men, berthed just below them, must be exposed to a direct and violent draft.

The wardroom mess room and the chief petty officer's mess room and quarters are beyond criticism in this respect, the possibilities for ventilation in both being all that could be desired. It is not so with the staterooms and country, which are lacking in ventilating facilities, and were entirely so until a ventilating shaft with aspirating cowl was supplied for the closets, of which there are two, each with a large enameled iron bath tub.

BATHING FACILITIES.

In addition to these bathrooms for the wardroom officers, the ship is supplied with a roomy four-shower wash room, placed just forward of the "drum room" on the starboard side. This was originally given over to the crew for bathing purposes, but when at the recommendation of the board of inspection the ship was stripped of all dispensable top weights, and among them the hammock nettings, this room, in lieu of any other place, was used for stowing the hammocks. Later it was thought that when the hammocks had been broken out for the night the showers might be available for the crew, but this proved possible only for a limited number, usually the engineer's force, that being the division most in need, and this left the room damp for the reception of the hammocks in the morning. Previously, and to some extent since, the men had been using the "head" as a bathroom, but with very undesirable results, so far as the appearance and sanitary condition of that part of the ship are concerned, as it required constant attention to insure even a comparative degree of cleanliness. This defect was not seriously felt during the warm weather, for the men could bathe from buckets on the deck, but now that the cold weather has set in there is absolutely no place for the crew to bathe. It is deplorable that this is the case, for the physical and moral well-being of all hands depends largely upon cleanliness. The ship should certainly be provided with proper hammock nettings.

WATER-CLOSETS.

The crew's "head" is located on the main deck in the deck house just forward of the "drum room" on the port side. The outboard side consists of three windowed doors, so that the whole side can be thrown open in warm weather or the latticed windows let down in cold weather and satisfactory ventilation secured. The floor is tiled and has a slight incline from all directions to a drain. On the inboard side the compartment is provided with four holes emptying into a continuously flushed trough, and on the after bulkhead with one trough urinal. This latter is not successfully irrigated on the inboard end, on account of the poor arrangement of the water pipe, and unless carefully watched filth accumulates and the odor is marked. It has been suggested to change these pipes to a complete reversal of their present arrangement, so that the irrigating force will operate from the inboard end outward and thus effectually flush the entire trough.

The wardroom officer's quarters are furnished with fixed wash basins, and these and the bath tubs together with the engine room bilges drain into a tank placed amidship abaft the after engine room bulkhead. This has an uncovered manhole, so that any gaseous emanations from it have free access to all, particularly the after parts of the ship. In spite of the innocent character of the drainage into the tank and the fact that it is pumped out every day and scalded out each week with live steam, it is a frequent source of unpleasant, if not unwholesome, odors. It has been recommended and approved that this manhole be covered with a plate, and that the tank be supplied with an air vent running through the upper deck and to a height of 7 or 8 feet up the mainmast, which arrangement will insure the proper ventilation of the tank and at the same time prevent the contamination of the living spaces. There is no possibility of gases backing through the pipes into the officer's quarters, as each basin and tub is supplied with an S-trap, and it seems that the above alteration will meet every defect in drainage.

WATER FACILITIES.

This ship is provided with two evaporators, one the Navy type (capacity 1,800 gallons in twenty-four hours) and the other a Baird No. 1 (capacity 500 gallons in twenty-four hours). They are effective in producing an ample amount of water of good quality for all the ship's uses. Only occasionally the water tastes slightly of salt, which seems to come over when distillation is carried on too rapidly.

There are seven tanks of a combined capacity of about 4,700 gallons, all of which can be used to hold washing and drinking water. But three of them, with a combined capacity of about 2,050 gallons, are used for this purpose, however, and these are situated, two on the starboard side of the shaft alley abaft the engine room and one in the overhang, and all are easily accessible both for inspection and cleaning. The upper deck is admirably suited for collecting rain water, and during the sojourn in the Tropics—the summer of 1899—this was the chief source of supply. The water collected was always pure.

REFRIGERATING PLANT.

The refrigerating plant has proved to be invaluable, both in relation to provisions and water for all hands, and in caring for the sick. The ice machine has a capacity of 1 ton a day, which provides the ship with all the ice it needs and keeps the water in the scuttle butt cold and the cold-storage room down to a freezing temperature. The cold-storage room, which is divided into three compartments, has a capacity adequate to the needs of the entire ship's company, as it is possible to carry at least two weeks' supplies of fresh provisions.

LIGHTING AND HEATING.

The ship is lighted with electricity throughout, but oil lamps are provided when the dynamo is not running. In view of the poor ventilating facilities the use of lamps is very undesirable, especially in bad weather, when doors, hatches, and ports are closed. The heating is by steam pipes, and though the system has not been put to the severe test of continued cold weather it is in the main satisfactory.

MEDICAL DEPARTMENT.

In fitting out this ship there was apparently no attempt to provide special sick quarters. There is an excellently equipped dispensary, situated in the extreme forward part of the deck house, just forward of the wash room on the starboard side and adjoining the chief petty officer's mess room, which is quite large enough for its primary purpose and the examination of simple medical and surgical cases.

It is amply fitted with bottle racks, lockers, and closets for the keeping of such medical and surgical stores as are frequently required, and is provided with a sink that drains into the forward starboard scupper and a bunk for the hospital steward.

THE SICK BAY.

The part of the ship allotted to the sick is forward on the berth deck under the forecastle. It is not separated from the general living and berthing space, as a bulkhead would cut off fresh air from the crew. Some degree of privacy is secured, however, by the use of a canvas screen. On either side of the sick bay is a hammock frame or pipe-frame bunk. When not in use these can be turned up against the ship's side out of the way, and on the whole they are convenient and comfortable. Between them there is plenty of room to hang a swinging cot, thus easily accommodating three patients at a time.

The ventilation is fairly good here, the two berth-deck ventilators being placed at the after end of this section set aside as the sick bay.

The provisions for lighting and heating are also good, and a large electric fan serves to increase the comfort and improve the ventilation. The sail locker, which is forward of the sick bay and separated from it only by a latticed partition, is perhaps an objectionable feature. The sick bay is reached by the berth deck or the forecastle hatch. In either case the approach is difficult, if a patient has to be carried. Notwithstanding that fact and its isolation from the dispensary, the forward part of the berth deck has been assigned as the station at "general quarters." This was selected because it is the only available part of the ship below the water line, but it is believed that the advantage of being in a protected part of the ship can in no way make up for its disadvantages. In view of this some other station has been promised, which will be nearer the dispensary or the medical storeroom, and well lighted.

STOREROOM.

The storeroom is located in the after part of the ship, on the starboard side, just forward of the tiller compartment. It is dry and roomy, but does not admit of systematic stowage, which must be regretted, as frequent and hurried access is necessary.

SUMMARY OF CRUISE.

This report embraces observations extending over a period of but little more than nine months. The first three months the *Vixen* was moored at the Norfolk Navy-Yard or anchored in its vicinity or in Hampton Roads. She sailed the latter part of May, stopping at Key West for coal, and reaching her destination—Bluefields, Nicaragua, Central America—on the 1st of June, 1899, where she remained at anchor until October 12. We were fortunately able to get in the lagoon and escape the constant rolling outside at the anchorage off the bluff.

During June, September, and October of our stay the weather was delightful, but July and August were marked by almost constant rain. The climate during the rainy season, and after prolonged residence, is extremely enervating and deleterious to the general physical tone. While in Bluefields the crew gradually lost in health, and during the latter part of our stay there the systemic exhaustion and impoverishment became so marked that I resorted very generally to tonic treatment and was tempted to prescribe stimulants. Our timely return north, however, obviated the necessity for the latter. It was deplorable that we were not supplied with a steam launch for surveying purposes, as without it the crew's endurance was put to a severe test. The crew was small, and day after day the men, with little change, were subjected to an all-day's row and the inclemencies of the weather.

Bluefields itself is healthy, except for those susceptible to lung troubles, which are responsible for most of the mortality.

Hygienic precautions in the town and vicinity are not observed, and it is only by virtue of the location and natural conditions that it is free from most of the infectious and contagious diseases. Bluefields is situated on the bank of the lagoon at the foot of a long range of high hills, and the frequent copious rains wash the filth into the lagoon and keep the streets and property in a fairly clean condition. The tide and river current in turn keep changing the lagoon water. If it were not for the increased dampness the water's edge would be the healthiest place to live. Then Bluefields is isolated from the possibility of land approach, and this also makes it easy for the health officers to keep the port free from disease.

Malaria is to be guarded against, of course, and new cases are constantly occurring, but considering the vast extent of swamp land and the number of mosquitoes and other insects it is surprising that malarial fevers are not even more common.

Good fresh meats are only possible for a ship with an ice machine and cold storage, for the municipal law prohibits the keeping of meat more than twenty-four hours after it is killed, and within that time it is either not palatable or not fit for food. Vegetables can be obtained only in very small quantities and limited varieties, and it was necessary to send to New Orleans, La., to complete the necessary supply.

Considering all the circumstances, the health of the crew has been good.

REPORT ON THE U. S. S. YANKTON.

By ALLAN STUART, *Assistant Surgeon, United States Navy.*

The *Yankton* is a converted yacht, 975 tons, built of steel. She was commissioned in May, 1898, and has been engaged for the past year in surveying the eastern end of Cuba.

IMPROVEMENTS.

The following changes affecting the medical department were made during the past summer at the Portsmouth Navy-Yard:

Sick bay.—This is situated on the berth deck, forward of the boiler room, and is 15 feet long by 7 feet 3 inches wide, and 8 feet 4 inches between decks. The wooden bulkhead which separated the sick bay from the berthing space for the men was taken down and replaced by a painted canvas screen with an air space of about 3 feet between the top and spar deck above, giving better ventilation, more light, and in no way diminishing the efficiency of the quarters for the sick.

Dispensary.—A small shelf for books and a shelf for storing boat boxes were added.

Brig.—A new brig, 6 feet 4 inches by 3 feet 7 inches, was built on the port side forward of the boiler room. It is ventilated sufficiently.

LIVING SPACES.

Cabin, wardroom.—The cabin and wardroom are comfortable and well ventilated. The cabin is abaft the engine room and entered through the wardroom country, which is in the extreme after part of the ship. There are staterooms for 8 commissioned officers, including the commanding officer.

Berth deck.—There is ample berthing space for the enlisted men. The petty officers sleep in the forward compartment, in which there are 16 bunks made of iron pipe. The berth deck is between the boiler room and the forward compartment. The distance between decks is

8 feet 4 inches. The arrangement of the hooks for slinging hammocks is admirable. They are riveted to bars of angle iron running athwart ship, attached to the spar deck above by "hangers" 17 inches long, the distance between the men lying in their hammocks and the spar deck above being about 40 inches. The air circulates freely above the sleeping men, which adds greatly to their comfort, especially in the Tropics.

WATER SUPPLY.

The evaporator has a capacity of 1,000 gallons of water per day, of good quality and quantity ample for ship's use.

ICE MACHINE.

About 250 pounds of ice are manufactured per day, and this quantity, carefully handled, is enough for all hands.

THE CRUISE FOR THE YEAR.

At the beginning of the year the ship was at the Norfolk Navy-Yard. Leaving about the middle of January she went to Santiago de Cuba, stopping at Guantanamo for two days on the way. While at Santiago she made a survey of the harbor. In June she went to Banes Bay, touching at Gibara on the way. After a stay of three weeks she left for the United States, and after stopping at Hampton Roads and Vineyard Haven reached the Portsmouth Navy-Yard August 1. Leaving Portsmouth October 19 the ship touched at Tompkinsville, Hampton Roads, Port Royal, S. C., Gibara, Nipe Bay, and anchored in Banes Bay November 22, where she remained engaged in surveying until December 23, when she started for Port Antonio, Jamaica, to coal, arriving after sunset December 24. She was placed in quarantine, but after communicating by wire with the board of health at Kingston, pratique was granted about noon of the twenty-fifth. The ship left Port Antonio for Banes Bay January 1, 1900.

BANES BAY.

This bay is on the northern coast of Cuba, 470 miles east of Havana, 90 miles north of Santiago, and about 110 miles northwest of Cape Maysi. The bay is entered from sea by a deep and narrow channel, called by the natives the "Cañon." It then widens out, the distance across being about 5 miles. The rise and fall of the tide is about 2 feet 6 inches.

Nearly all the banana and sugar plantations in the vicinity are owned by an American fruit company, which is putting up a large plant for making sugar on the western side of the bay.

There is no history of yellow fever ever having prevailed in the locality. The reason is obvious. There is no communication by rail and no direct intercourse by water between the bay and the foci of endemicity. An immense amount of fruit is shipped annually, but the steamers come and go to the northern ports of the United States. There is no reason why this should not always remain a healthy port, provided the ordinary sanitary precautions are taken.

Surveying parties.—The surveying parties leave the ship at 7 a. m., returning between 11 a. m. and 11.30 a. m., remaining on board until 2.30 p. m. when they start out again, returning to the ship about 5.30

p. m. Both officers and men are required to take their rain clothes with them on all occasions. The health of the working parties has been excellent.

REPORT ON THE U. S. S. ABARENDA.

By EDWARD M. BLACKWELL, *Assistant Surgeon, United States Navy.*

Since I joined this ship at Norfolk, Va., on February 6, 1899, the general health of the crew has been very good. The ship was undergoing general repairs at that time, and a great many improvements were made and conveniences added. The great majority of the crew were quartered and subsisted aboard the receiving ship *Franklin*, as the old quarters of the crew were being converted into storerooms, the new quarters had not been completed, and the galley range was undergoing repairs. This state of affairs continued until March 16, when the last draft of men was received aboard.

CREW'S QUARTERS.

The berth deck is situated between decks of the forward hold, and has a capacity of about 12,400 cubic feet. The ceiling and sides are cork painted but, as no wooden deck was laid upon the iron deck, it gets very hot below when the sun shines upon it. For ventilation there are ten large air ports on each side, which can be left open at sea in good weather. A large hatch 14 by 20 feet opens into the berth deck, and this can be left open in port when the awning is spread and at sea in good weather, and this with the air ports gives very good ventilation. Sixty-eight men occupy the berth deck, which gives an air space for each man of about 200 cubic feet. Four men swing their hammocks in the forecastle, which is open at the after end and has ample space and ventilation. In cold weather it is closed with a canvas awning. Four men sleep in the passageways amidships under the bridge deck, where the ice machine, cold-storage rooms, scuttle butt, distiller, evaporator, and machine shop are situated, and have ample space and ventilation. Ten petty officers occupy six staterooms under the bridge deck. These rooms have each a capacity of about 400 cubic feet, and each one has an air port for light and ventilation.

OFFICERS' QUARTERS.

The wardroom is situated aft, under the quarter-deck. Six staterooms open into the country, one into the passageway leading to the country, and one is situated under the after part of the bridge deck on the port side. They have a capacity of 400 or 500 cubic feet, and are fairly well lighted and ventilated. The two after rooms are smaller, having capacities of 300 and 350 cubic feet, respectively. Their bunks are placed close to the ceiling, and this shuts out nearly all the light from the air ports, which makes these rooms very dark. Each room has an electric light and an electric fan. The country has a capacity of about 2,300 cubic feet, and is well lighted and ventilated by a large skylight above and two air ports in the stern of the ship.

The executive officer's room is just forward of the wardroom on the port side, has a capacity of about 500 cubic feet, and is well lighted and ventilated by four large air ports.

The commanding officer's cabin, with stateroom attached, is situated just forward of the wardroom on the starboard side. They have capacities of 900 and 500 cubic feet, respectively, and are lighted and ventilated by six large air ports.

FIRE ROOM AND ENGINE ROOM.

These rooms are fairly comfortable. The fire room has two large ventilators, and the hatches can be left open in good weather, so there is free circulation of the air. The engine room has two ventilators and a wind sail, and, with a large hatch which can be left open except when it is raining, it has good ventilation. The temperature of these rooms averages about 125° F., the highest being 132° F. and the lowest being 118° F., while underway.

SICK QUARTERS.

The sick bay is situated on the starboard side under the after part of the bridge deck. It has a capacity of about 900 cubic feet, and connected with it is the dispensary with a capacity of about 400 cubic feet. The sick bay is ventilated by two small air ports on the side, a large air port in the after bulkhead, and a small ventilator from above. The dispensary has one small air port. There are two doors to the sick bay and one from the dispensary opening into the passageway. Only one of these doors is used, so that in warm weather two of the doors are left open and screen doors put in, and these, with the air ports and ventilators, give excellent ventilation. There is also an electric fan in the sick bay, which adds greatly to the comfort of the patients in warm weather. There are four iron-framed cots fastened to the walls, so that when not in use they can be folded up against the wall so as to occupy very little space. There are also hooks for two swinging cots. There is a sink in the dispensary, and a stationary wash basin in the sick bay. A water-closet is also connected with the sick bay. In very warm weather patients are swung in cots upon the port side of the bridge deck under an awning. The ice machine is just forward of the dispensary, and it makes considerable noise while in operation. The crew's library is kept in the sick bay, and the hospital steward and hospital apprentice act as librarians. There is a steam radiator in the sick bay and one in the dispensary. The sick bay is small and would be crowded in an operation if there were other patients in the room. On the whole it is well adapted to the ship, and its location is about as good as could be found on board. The medical storeroom is forward with the other storerooms under the forecastle. It is dry, well lighted, and ventilated by two air ports.

STOREROOMS.

All the storerooms, except the paymaster's and electrician's, are forward under the forecastle. They are kept clean and dry, and are well lighted and ventilated. The electrician's storeroom is under the bridge deck on the starboard side. The paymaster's storerooms are aft under the wardroom on the port side. They are dark and badly ventilated.

WATER-CLOSETS, BATHROOMS, AND PANTRIES.

The officers' water-closet is on the starboard side, and opens into the wardroom. A ventilator opens into it from above and carries off all gases, and when the hopper is properly cleaned and flushed there is no odor. The officers' bathroom is on the port side under the bridge deck. It has a porcelain-lined iron bath tub and a water-closet.

The crew's water-closets are on each side under the after part of the forecastle. Each room has two porcelain lined iron water-closets. They are kept in good condition, and there is no more odor than is usual with iron water-closets. The urinals are just aft of the water-closets on the starboard side.

The crew have no bath room; but have portable tubs and a shower bath. In cold weather they use the forecastle and the port passageway under the bridge deck. The engineer force uses the port passageway at all times.

The officers' pantry is just forward of the ward room on the port side, and has a sink for washing dishes and carrying off drainage. The commanding officers' pantry is amidships just forward of the ward room. Both pantries are well lighted and ventilated.

WATER SUPPLY.

The evaporators and distiller supply about 1,500 gallons of water per day, and at no time during the cruise has water from shore been used for drinking purposes. The quality has been very good, there being very little salt in it. The drinking water is pumped from the tanks into the scuttle-butt, which is connected with the ice machine, so that the water is always cool and palatable.

FOOD.

The food is generally well cooked and prepared, and I have not heard of any complaint among the crew. The ship's messes usually commute their rations, and the caterers supply them from the markets, so they generally have fresh food.

REFRIGERATING PLANT.

Just before leaving Norfolk, Va., there was installed in this ship an "Allen dense air ice machine" which has a capacity of about 600 pounds of ice per day. It is connected with the cold storage rooms, one for the officers and one for the crew, each capable of holding 1,000 pounds of fresh meat, which can be kept in perfect condition for several months.

ILLUMINATION.

An electric plant was installed shortly before leaving Norfolk, Va. It furnishes light to all parts of the ship and runs the electric fans, and it has given entire satisfaction.

HOLDS, BILGES, ETC.

As this vessel was built for the grain trade, she has four large holds. These can be easily cleaned and disinfected. The bilges are kept clean and dry, and there is very seldom any offensive odor from them. The trimming tanks and double bottoms are generally kept full of fresh water for use in the boilers when necessary. There is little or no ventilation in the shaft alley, and the air becomes so foul that it is impossible to remain in it longer than ten minutes while under way.

SUMMARY OF THE CRUISE.

During the year this ship has been in port two hundred and sixty-seven days and at sea ninety-seven days. The following ports have been visited, viz: Norfolk, Va.; Hampton Roads, Va.; Montevideo, Uruguay; Punta Arenas, Chile; Valparaiso, Chile; Pitcairn Island; Papeete, Society Islands; Apia, Samoa; Pago-Pago, Samoa; Leone, Samoa; and Aukland, New Zealand. The ship lay at Norfolk, Va., from January 1 to April 24. During that time the weather was very changeable, and at times very cold, often being several degrees below zero. There was an epidemic of variola in the city; but the crew were all vaccinated, and, although they went on liberty repeatedly, no symptoms of the disease developed among them.

We remained at Hampton Roads from April 24 until April 30, when we started for Pago-Pago, Samoa. We arrived at Montevideo on May 30, and left there on June 7. The health of the city was excellent, and, on account of its position upon a hill, it is one of the cleanest cities in the world, for the winds and rains leave very little for the street-cleaning department to do. No diseases developed among the crew, on account of liberty, except gonorrhea and chancroid. We only stopped one day at Punta Arenas. The weather was damp and chilly. It is the most southern city in the world, and has about 7,000 inhabitants. It appeared to be in a very insanitary condition. The drainage is all on the surface, and as there had been heavy rains the mud was from 6 inches to 2 feet deep in the streets. We were in the Straits of Magellan five days, and the weather was very changeable and disagreeable. We were in Valparaiso from June 25 to July 3, and during that time the weather was generally damp and disagreeable, and the city was in a very insanitary condition. There had been heavy rains a few days before our arrival, and the sewers had been stopped by mud and débris from the mountains above the city. Mud covered the streets from 6 inches to 6 feet, and street car traffic was entirely suspended. There was considerable influenza, malarial fever, and typhoid fever in the city. The crew were given liberty, and one of them developed remittent fever about two weeks after leaving there. No other diseases developed except gonorrhea and chancroid.

We touched at Pitcairn Island and remained a few hours. The climate there is very healthful, and there is rarely ever any sickness on the island. The fruit, vegetables, and poultry were the best we have had on the cruise. We lay at anchor in Papeete Harbor, Tahiti, from July 26 to August 1, and in all that time the weather was fine, the average temperature being 81° F. The city has a population of about 5,000, most of whom are natives, with about 500 whites, including the French garrison of about 150 soldiers. There is a small military hospital, quite well ordered, and conducted on modern principles. The people are very hospitable, and we enjoyed our stay very much. No disease developed among the crew except gonorrhea and chancroid. The health of the city was very good.

We arrived at Apia August 10, and most of our time since has been spent at that place and at Pago-Pago. The climate of the Samoan Islands is about as pleasant and healthful as can be found in the Tropics. The highest temperature during our stays at Apia was 86° F. and the lowest was 83°F., the average being about 84°F. Apia is situated on the north coast of Upola Island, on a small bay. It is an unsafe and an uncomfortable harbor, as it has no protection against seas or gales from the northward, and ships at anchor roll unceasingly with the swell. The health of the place is very good generally, but there is some malarial and typhoid fever at times. There is a small hospital owned by the Seventh-Day Adventists. It is conducted on modern principles, is well ordered, and has most of the modern improvements. It is well adapted for the care and treatment of patients, and the charges are very moderate. It is in charge of a skillful surgeon, who extends invitations to visiting surgeons to witness and assist in operations.

PAGO-PAGO, TUTUILA ISLAND, SAMOA.

We arrived at Pago-Pago on August 13, and have spent the greater part of our time there since. It is in latitude 14° 18′ 06″ south and longitude 170° 42′ 14″ west. The climate is pleasant and healthful, although there is a good deal of rain, for the lofty hills around the harbor act as condensers and cause the clouds to precipitate their moisture in and around the harbor, even when there is no rain elsewhere. There was no great change of temperature during our stay, the highest being 85° F. and the lowest being 77° F., with an average of about 81°F. It is a beautiful land-locked harbor, surrounded by hills and mountains from 200 to 1,500 feet high, and it is perfectly safe for ships in all kinds of weather. It is evidently the crater of an extinct volcano, the mountains surrounding it being the rim of the crater. There is very little level ground around the harbor, the mountains generally rising abruptly from the water's edge.

In and around the villages of Pago Pago, Faga Toga, Ana, and Utulu there is considerable level ground and a good deal of swampy or marshy land. The island is of volcanic formation and the mountains are composed of volcanic rock, which disintegrates very easily from the effects of the heat of the sun and the moisture from the frequent rains, so that even on the highest peaks the soil is good enough to support a luxuriant vegetation. The soil in the valleys and along the coast is composed generally of a coarse volcanic gravel, mixed with a brown loam composed of decomposed vegetable matter and pulverized volcanic rock. The soil is very porous and streams coming down from the mountains sometimes disappear before reaching the sea. Owing to the rock and gravel in the soil it is very difficult to cultivate it. The only things cultivated to any extent is the taro, which grows in marshy ground as well as upon the highlands, and sugar cane, which is only used to make thatch for the houses.

VEGETATION.

The vegetation of Tutuila is very luxuriant, the mountains being clothed with trees, vines, and shrubs from the summits down to the water's edge. Cocoanuts and bananas of several kinds grow in profusion on the lowlands and plateaus, and with the bread fruit and taro (*Colocasia antiquorum*) they form the chief articles of food for the natives. Copra, or the dried fruit of the cocoanut, is the only product of any importance that is exported. Oranges, limes, and lemons grow, but are of very indiffent quality. A few pineapples are raised and mangoes are plentiful. The taamu, which appears to be a cross between the taro and the yam, although not so good as either, thrives well there. Watermelons, cucumbers, squashes, tomatoes. and corn all grow there, but do not yield well. The vi (*Spondias dulcis*), a kind of banana, grows abundantly and is highly prized by the natives as an article of food. The guava (*Psidium*), the alligator pear (*Persea gratisime*), the esi, or mummy apple, the sasalpa, a fruit like the prickly pear, mock oranges, and rough-skinned lemons are some of the fruits that flourish on the island.

Kava (*Piper methysticum*) is much used by the natives as a beverage. It is used in the form of an infusion made from the powdered root of the plant. It is said by the natives to be refreshing and stimulating; but its after effects are depressing and debilitating, and this is probably one of the reasons why the natives sleep so much. There is a great variety of trees on the island, which is generally thickly wooded. The natives are beginning to cut the trees from the mountain slopes in many places to make clearings for planting the taro. The following are some of the principal trees on the island: The fan (*Hibiscus tiliaceus*) grows about 50 feet high and about a foot in diameter, and is very crooked. The toi (*Alphitonia excelsus*) grows about 75 feet high and about 15 inches in diameter, and is used chiefly for making posts for building native houses. The tevai (*Rhus tailensis*) is very abundant and grows about 100 feet high and about 3 feet in diameter. The ifilele (*Afzelia bijuga*) grows about 60 feet high and from 3 to 5 feet in diameter. It is spreading and very bushy and crooked, and its chief use is for making kava bowls. The ifi, or native chestnut tree (*Inocarpus edulis*), bears a nut which the natives cook and eat. It grows about 90 feet high and 3 feet in diameter. Its roots extend from the trunk to the ground in a triangular shape, and are very flat and from 1 to 2 inches thick. The milo (*Thespesia populnea*) grows about 30 feet high and about 2 feet in diameter. Its chief use is for making clubs and kava bowls. The futu (*Baringlonia speciosa*) grows about 40 feet high and about 2 feet in diameter. It is very knotty and bears a poisonous nut which the natives use for killing fish. The leva (*Cerbeia lactaria*) grows about 60 feet high and 2 feet in diameter. It bears a beautiful red fruit, which is not fit to eat. The atone, or nutmeg tree, of which there are several kinds (*Myristica*), grows about 50 feet high and 1 foot in diameter. The nuts have very little flavor and are not used. The mosóoi (*Cananga odorata*) bears a beautiful and fragrant flower and a black berry, which is the principal food of the wild pigeons and doves.

ANIMAL LIFE.

There is only one mammal indigenous to the island, the flying fox, or fruit bat (*Frugivora*). There are a great many pigeons and doves, but very few other birds. There are rats, flies, mosquitoes, and a great many lizards, but there are no poisonous reptiles or insects. The natives raise a few pigs and domestic fowls and there are a few cattle and sheep. There appear to be a good many fish in the waters around the island, but the natives with their primitive methods catch very few of them. The principal fish are the mullet, the mackerel, the bonita, and a kind of herring. Sharks and turtles are also found. In certain parts of the island the fish are poisonous at certain times, but there are no poisonous fish in the harbor. Highly colored fish are generally unfit to eat, and more especially is this the case when they are caught near coral reefs and at the time of the spring tides. Clams are found in some of the inlets, shrimps can be caught in the mountain streams, and toadfish inhabit the stagnant pools.

UNITED STATES COALING STATION.

The United States coaling station is situated on the southern shore of the harbor on a point of land known as Swimming Point. The United States Government has acquired considerable land in the harbor, and at the present time the contractors for the station are engaged in excavating from the mountain side and filling in the lower places. A neat four-room cottage has been built for the officer in charge of the station, and the wharf and coal shed are in process of construction.

WATER SUPPLY.

The water supply of the harbor comes from mountain streams, and with the exception of vegetable matter it is very pure. It rains very frequently and the streams are never dry. A reservoir has been built in one of the valleys about 200 feet above the village of Faga Toga, and water is conducted in pipes to the village and the coaling station. The reservoir holds about 100,000 gallons of water, and will furnish an ample supply for the village, the station, and ships wanting water. It is situated above all dwellings, so there is no danger of its becoming polluted. On August 25, before the reservoir was begun, I made as exhaustive an analysis of the water as the limited reagents and apparatuses of the ship would permit, and made the following report to the commanding officer: (1) Reaction, neutral; (2) chlorides, not more than 1.5 parts to 100,000 parts of water; (3) salts of calcium, none; (4) ammonia, traces; (5) organic matter, moderate amount. The height of the reservoir above the station gives sufficient force to throw water from a fire hose over any of the buildings.

SANITARY SURROUNDINGS.

The sanitary conditions of the harbor are generally very good. The climate is good, although at times very damp from the frequent rains. The land is generally high and steep, and the frequent rains wash down the decomposing materials and keep everything clean. There is a rise and fall of the tide of about 3 feet, and the average depth of the water of the harbor is about 20 fathoms. In the lowlands and around the villages there are a good many swamps and marshes. It would seem that these swamps should be the sources of malarial infection, as they are stagnant and have a good deal of decomposing vegetable matter in them, but there is very little malarial fever in the harbor. The principal marshes are in and around the village of Faga Toga and the United States lands. Lying just back of a plat of United States land in the village was a stagnant pool surrounded by a marsh. This became quite offensive, and on August 25 a letter was written to the commanding officer calling attention to the insanitary condition of this pool. Since then a drain has been cut and kept open to the beach, and the ebb and flow of the tides and the frequent rains washing it out have made its sanitary condition very fair. These swamps and marshes could be easily remedied by proper drainage and filling in. The natives generally throw their refuse into the marshes and streams, and this increases their insanitary condition.

DISEASES.

The most common affections among the natives of the harbor are bronchial, rheumatic, neuralgic, and digestive troubles. The first three are probably due in great part to the fact that the natives get their clothes wet very often and allow them to dry upon their bodies. Those who wear least clothes are generally least affected. The digestive troubles are probably due to the character and the mode of preparing and eating their food, and to sedentary habits. They cook once a day and eat twice a day very heartily. These troubles generally yield very readily to simple remedies. There was an epidemic of whooping cough among the children all during the ship's stay, and it was quite fatal. I have seen one case of pneumonia, and only one case of intermittent fever, although there is a good deal of complaint of chilly sensations, followed by some fever and sweating. There have also come under my observation three cases of pulmonary tuberculosis, one from the east end, one from the west end of the island, and one from the harbor itself.

Blindness in one eye is very common, and it is generally due to ophthalmia in childhood, which has been neglected. The cornea is opaque and the lens generally bulges forward and adheres to it. As a rule, all the children have a peculiar eruption which I have been unable to diagnose. It generally spreads over the whole of the body and limbs. It is macular, papular, vesicular, and pustular in the different stages, and often in the later stages there are large foul ulcers. The natives think it is a necessary disease of childhood, and if it is late in making its appearance, they sometimes inoculate the child with virus from the pustules of another child. There appears to be very little constitutional disturbance attendant upon it. The fact that the children usually go naked with only a napkin around the loins, and are exposed to all kinds of irritations, may be a factor in the production of the eruption.

Every native either has chronic ulcers or the scars of them. They are probably due to the bites of insects and to scratches and bruises gotten in the bush and mountains, which are neglected and become infected, and thus result in ulcers. They generally yield readily to bichloride dressing and the internal administration of iodide of potash. Elephantiasis of the legs is very common, but I have seen very few cases where the scrotum and anus were involved. Hydrocele is quite common, and I have operated on half a dozen cases. The natives very often tap a hydrocele with a trochar made of a bone from the wing of the flying fox. Venereal diseases are very rare among the natives and only two cases have come under my notice. Our men have been on liberty at Pago-Pago and Apia repeatedly, yet no venereal disease has developed among them.

A lady who lives in Faga-Toga has practiced considerably among the natives and with very good results. She has had no medical education except what she has picked up from a United States dispensatory and from surgeons who have visited the harbor. She keeps the commoner drugs and appears to understand their uses fairly well and to prescribe them intelligently. I have seen several fractures she has reduced and treated with very good results. Two amputations that she has performed, one of the arm and one of the forearm, have come under my observation, and the results were very good. She had native assistants, operated without an anæsthetic, and the only instruments she had were a handsaw and a razor.

EPIDEMICS.

In 1890 and 1891 there was an epidemic of influenza which caused some deaths at the time. After the epidemic had subsided there were a number of deaths from apparently slight troubles, and it is supposed that they were due to the depressing effects of the influenza.

In 1893 there was an epidemic of measles that spread over the whole group of islands, and from 1,500 to 2,000 people died. The large mortality was probably due to the fact that the natives, not understanding the nature of the trouble, took their cold baths every day as usual. In Pago-Pago Harbor there were not over half a dozen deaths.

In 1895 there was an epidemic of breakbone fever in the islands, which caused some deaths; but there were none in the harbor. There are from 600 to 700 natives in and around the harbor in the various villages. They are a mild and friendly disposed people, and their moral tone is quite high.

The natives of these islands are said to be the best specimens, both physically and morally, to be found in the South Seas. Their houses consist of thatch roofs supported on posts with cocoanut mats as screens to keep out the wind and rain, and this is about the best kind of house for that climate. There are several white traders in the harbor, but their influence upon the simple natives is anything but good. The natives have their churches, mission houses, and native schools.

We stopped at Leone one day and have touched there several times en route to and from Apia. It is the largest and most important town on the island, and is situated on a bay of the same name at the west end of the island. There is a good deal of level country around it, and considerable copra is exported.

AUCKLAND, NEW ZEALAND.

We arrived at Auckland on December 15, and have been here ever since. The climate is temperate and bracing, and its good effects upon the crew have been marked. The average temperature up to the present has been 66° F., the highest being 70° F., and the lowest being 63° F. The city has a fine location upon a splendid harbor, and it has a large commerce. The health of the city is very good for one of its size. The prevailing diseases are respiratory troubles and malarial and typhoid fevers. Just at present there is an epidemic of influenza in the city, but the worst of it is over now. Malarial and typhoid fevers generally prevail from January to May. The malarial fevers are probably due to the great number of mud flats, swamps, and marshes that surround the city. The typhoid fever is due, in great part, to the water supply of the city, which is collected from a watershed that is thickly populated.

The Auckland hospital and charitable institution is located just outside of the city, upon a hill that commands a fine view of the city, harbor, and vicinity. It can accommodate 200 patients, and has an able staff of physicians, surgeons, and trained nurses. It is conducted upon the most modern principles, and has all the modern instruments and appliances. There is a fine country around, and provisions are very cheap and of the best quality.

HEALTH OF THE SHIP.

Two-fifths of the admissions were on account of injuries and venereal diseases, and nearly three-fifths of the sick days were due to the same causes. None of the sickness can be traced to insanitary conditions aboard this ship. While in Samoa there was a tendency among the crew to catarrhal troubles, probably due to the dampness of the air and to fresh breezes. After remaining there for some length of time the men became somewhat enervated from the climate, and their tissues appeared to get soft, so that any little contusion or abrasion would result in an abscess or an ulcer. These, however, would yield readily to simple treatment.

There have been several very interesting diseases and injuries, but they have been fully described in the quarterly reports and require no further mention here. There has been 1 case each of chronic pulmonary tuberculosis, intermittent fever, pneumonia, and pericarditis, and 2 each of remittent fever and catarrhus epidemicus during the year. The case of pulmonary tuberculosis was contracted prior to entrance into the naval service. There have been 16 venereal cases treated but not admitted to the sick list. At present there are no venereal diseases aboard the ship. The majority of the diseases have been of no severity.

Three persons have been examined for the naval service; all were accepted.

There have been 39 persons vaccinated, and in 30 of them or about 75 per cent, successful results were obtained.

SPECIAL REPORTS.

REPORT ON THE MEETING OF THE AMERICAN MEDICAL ASSOCIATION.

By Robert A. Marmion, *Medical Director, United States Navy.*

In obedience to the Department's order of May 26, 1900, I proceeded to Atlantic City on June 5, 1900, as delegate to represent the Medical Department of the Navy at the meeting of the American Medical Association.

The meeting was called to order late in the forenoon of June 5, and after addresses of welcome by the governor of New Jersey and the mayor of Atlantic City the routine of the association was regularly proceeded with.

A very interesting address by the president of the association, Dr. W. W. Keen, of Philadelphia, was listened to with marked attention by the large gathering of members and others. While some time was devoted by him to the consideration of matters relating to the organization itself, he dwelt at considerable length and with great emphasis upon the necessity for the endowment of medical colleges by the State as well as by the usual donations from private sources.

The reports of the committees appointed at the last meeting showed, as a general rule, that the business which had been placed in their hands was still unfinished.

At about 2 o'clock the association proper adjourned until Wednesday, June 6.

The afternoon was occupied by the various sections in the business which belonged especially to each of them and in the reading of papers and the discussion of matters which belonged particularly to them.

One is struck at the outset with the vast array of very interesting matter covered by the many papers to be read in the various sections, and is forced to regret that all of these sections are in session at the same time, and some of them are in session while the general meeting is in session, rendering it practically impossible for anyone to follow the proceedings of the society as a body and those of any one section.

In the general session of the second day (Wednesday, June 6), the following report was made by Dr. Victor C. Vaughn, of Ann Arbor, Mich., a member of the committee appointed at the request of the Surgeon-General of the Army for the purpose of ascertaining the causes of the existence and spread of typhoid fever in national encampments and of suggesting means for prevention. Other members of this board were Maj. Walter Reed, U. S. A., and Maj. E. O. Shakespeare, U. S. V., the last named having died shortly before the meeting of the association. The conclusions reached by this board and detailed by Dr. Vaughn are:

1. Every regiment in the United States service in 1898 developed typhoid fever.
2. More than 90 per cent of the volunteer regiments developed typhoid fever within eight weeks after assembling in the State encampments.
3. Most, probably all, of the regular regiments developed typhoid fever within less than eight weeks after going into camp.

4. Typhoid fever not only appeared in every regiment in the service, but it became epidemic, both in the small encampments of not more than one regiment and in the larger ones consisting of one or more corps.

5. Typhoid fever became epidemic in camps located in the Northern as well as in those located in the Southern States.

6. Typhoid fever is so widely distributed in this country that one or more cases are likely to appear in any regiment within eight weeks after assembling.

7. Typhoid fever usually appears in military expeditions within eight weeks after assembly.

8. The miasmatic theory of the origin of typhoid fever is not supported by the investigations of that board.

9. The pythogenic theory of the origin of typhoid fever is not supported by the investigations of the board.

10. "Our investigations confirm the doctrine of the specific origin of typhoid fever."

11. With typhoid fever as widely disseminated as it is in this country, the chances are that if a regiment of 1,300 men should be assembled in any section and kept in a camp, the sanitary conditions of which were perfect, one or more cases of typhoid fever would develop.

12. Typhoid fever is desseminated by the transference of the excretions of an infected individual to the alimentary canals of others.

13. Typhoid fever is more likely to become epidemic in camps than in civil life because of the greater difficulty of disposing of the excretions from the human body.

14. A man infected with typhoid fever may scatter the infection in every latrine of a regiment before the disease is recognized in himself.

15. Camp pollution was the greatest sanitary sin committed by the troops in 1898.

16. Some commands were unwisely located.

17. In some instances the space allotted the regiments was inadequate.

18. Many commands were allowed to remain on one site too long.

19. Requests for change in location made by medical officers were not always granted.

20. Superior line officers can not be held altogether blameless for the unsanitary condition of the camps.

21. Greater authority should be given medical officers in matters relating to the hygiene of camps.

22. It may be stated in a general way that the number of cases of typhoid fever in the different camps varied with the method of disposing of excretions.

23. The tub system of disposal of fecal matter as practiced in the Second Division of the Seventh Army Corps is to be condemned.

24. The regulation pit system is not a satisfactory system of disposing of fecal matter in permanent camps.

25. This board recommended that in permanent camps where water carriage can not be secured, all fecal matter should be disinfected and then carted away from camp.

26. Infected water was not an important factor in the spread of typhoid fever in the national encampments in 1898.

27. Flies undoubtedly served as carriers of the infection.

28. It is more than likely that men transported infected material on their persons or in their clothing, and thus disseminated the disease.

29. Personal contact was undoubtedly one of the means by which the infection was spread.

30. It is probable that the infection was disseminated to some extent through air in the form of dust.

31. A command badly infected with typhoid fever does not lose the infection by simply changing location.

32. When a command badly infected with typhoid fever changes its location, it carries the specific agents of the disease in the bodies of the men, in their clothing, bedding, and tentage.

33. After a command becomes badly infected with typhoid fever, change of location, together with thorough disinfection of clothing, bedding, and tentage, is necessary.

34. Even an ocean voyage does not relieve an infected command of its infection.

35. Except in case of most urgent military necessity one command should not be located on a site recently vacated by another.

36. The fact that a command expects to change its location does not justify neglect of proper policing of the grounds occupied.

37. It is desirable that the soldiers' bed should be raised from the ground.

38. In some of the encampments the tents were too much crowded.

39. Medical officers should insist that soldiers remove their outer clothing at night when the exigencies of the situation permit.

40. Malaria was not a prevalent disease among the troops that remained in the United States.

41. The continued fever that prevailed among the soldiers in this country in 1898 was typhoid fever.

42. While the investigations of the board show that coincident infection with malaria and typhoid fever may occur, the resulting complex of symptoms does not seem to be sufficiently well defined and uniform to be recognized as a separate disease.

43. About one-fifth of the soldiers in the national encampments in the United States in 1898 developed typhoid fever.

44. Army surgeons correctly diagnosed a little less than half the cases of typhoid fever.

45. The percentage of death among cases of typhoid fever was about 7.5.

46. When a command is thoroughly saturated with typhoid it is probable that from one-third to one-quarter of the men will be found susceptible to the disease.

47. In military practice typhoid fever is often apparently an intermittent disease.

48. The belief that errors in diet with consequent gastric and intestinal catarrh induced typhoid fever is not supported by the investigations of the board.

49. The belief that simple gastro-intestinal disturbances predispose to typhoid fever is not supported by the investigations of the board.

50. More than 80 per cent of the men who developed typhoid fever had no preceding intestinal disorder.

51. The deaths from typhoid fever were more than 80 per cent of the total deaths.

52. The shortest period of incubation in typhoid fever is probably something under eight days.

53. One who has lived in a camp in which typhoid fever is prevalent is liable to develop this disease any time within eight weeks after leaving such a camp.

The report of the board of trustees exhibted a very satisfactory condition both in the financial and membership department of the association.

The Rush monument committee reported a fund on hand of a little over $11,300. Inasmuch as it is the desire to raise the sum of $100,000, all told, the completion of the monument at an early date is far from being assured, particularly as it has taken about sixteen years to raise the comparatively small amount now on hand.

The greatest part of the afternoon of the second day was occupied by the committee on nominations, of which I was a member. The principal nominations were as follows:

For president, Dr. Charles A. L. Reed, of Cincinnati, Ohio.

For first vice-president, Dr. A. W. Calhoun, of Atlanta, Ga.

For second vice-president, Col. A. A. Woodhull, Medical Department, United States Army.

For third vice-president, Dr. Philip Marvel, of Atlantic City, N. J.

For fourth vice-president, Dr. William Quinn, of Chicago, Ill.

For permanent secretary, Dr. George H. Simmons, of Chicago, Ill.

At the third day's session, namely, Thursday, June 7, an attempt was made to secure the influence of the association in the direction of causing the adoption by the Government of the Bertillon system of classification of the causes of death. After considerable debate the attempt failed.

At the last day's general session the question of the admission of members of the Medical Association of Hawaii to membership in the American Medical Association was favorably acted upon.

St. Paul, Minn., was chosen as the meeting place for next year and the first Tuesday in June was the date designated therefor.

In viewing the vast amount of instructive matter contained in the many papers prepared to be read in the sections to which their subjects naturally assign them, medical men can not but regret that the time allotted to the deliberations of the American Medical Association is so very short. In my capacity as delegate representing the Medical Department of the Navy I deemed it of first importance to attend the general meeting of the association.

It is impossible, as previously stated, for one to attend the meetings of the association and also to follow the deliberations of any one section. He must either give up the one or the other and attach himself to one or two sections. I made the attempt to attend the reading of several papers in different sections, presuming that an approximation to schedule time might be depended upon, but my attempt was a signal failure. If I went, for example, to hear a paper which was scheduled to be read first at an afternoon's meeting, I would find that the section was occupying itself with unfinished business left over from the morning's meeting; so that it is impracticable for one to systematically pursue any plan unless he attaches himself to one section and abjures everything else.

The number of members who registered at Atlantic City during this meeting reached nearly 2,000. Inasmuch as the association numbers about 9,000 members those registering at Atlantic City may be considered a remarkably large proportion of the total membership.

REPORT ON THE MEETING OF THE ASSOCIATION OF MILITARY SURGEONS.

By John C. Wise, *Medical Director, United States Navy.*

I have to submit the following report on the proceedings of the Association of Military Surgeons of the United States, which met in New York City May 31 last, and which I attended, by the Department's order, as a representative of the Medical Department of the Navy.

The proceedings of the meeting were of an unusually interesting character, and all of the large list of papers was devoted to subjects germane to the care of the personnel of the Army and Navy in time of peace and war.

As our forces on land and sea have increased so largely in the past few years the problems of camp sanitation, transport of troops, recruiting, tropical and epidemic diseases have assumed a greater and more vital importance, and the "raison d'etre" of this association has been distinctly emphasized.

The meeting at New York was largely attended and the discussions excited great interest in the subjects under consideration. I can not too earnestly bespeak for this useful and growing organization the good wishes and support of the Department, representing as it does the only medium for the study and discussion of military hygiene, medicine, and surgery, open alike to the regular and volunteer services.

The forty-two papers submitted were prepared in the following sections, viz:

1. Examination of recruits.
2. Camp sanitation.
3. Rations.
4. Transport of wounded.
5. Field service.
6. Miscellaneous.

Brief notice will be made of papers having especial interest for the naval service. Capt. Myles Standish ably discussed the question, "What should be the standard of vision required of enlisted men in the United States Army?" It was contended that 20/20 of Snellen's type for each eye was much beyond the acuity required, and that 20/20 for the right eye and 20/40 for the left eye was sufficiently high for all practical purposes. It is obvious that the visual requirements for soldiers and sailors must be a sliding scale, governed by the law of supply and demand. In a nation so rich in the possession of a strong and numerous population as is the United States it must be considered of very doubtful propriety the need of lowering physical standards in any direction, especially in view of the number of men who are invalided for disease of origin prior to enlistment.

Surg. H. G. Beyer, U. S. N., submitted a careful study on "The physical factor in examinations for the Army and Navy," and it is hoped that it will reach the attention of all officers interested in the duty of enlistment. This officer argues for the necessity of establishing an ideal physical standard, and this he proposes to accomplish by the compilation of percentile tables, computed from the data in the records of enlistment. Officers have greatly felt the need of such a standard.

The subject of the ration was discussed by several able officers who have given the matter special consideration. Major Seaman, United States Volunteer Engineers, contends that the United States Army ration "is too highly animalized" for the Tropics, where there is no tax on the heat-producing functions. A closer conformation in the elements of the ration to the demands of nature in certain localities is most wisely urged; as Koerfer expresses it, "From the fish-oil polar zone through the pork-fat temperate zone to the olive-oil and vegetable tropic zone." If the physiologists, of whom Voit is the exponent, are right in the statement that 3,050 calories is the proper amount of food for a man doing an ordinary day's work, then the 3,800 caloric units of the American soldier are in excess, and must eventuate in disease.

That this position is absolutely true there can be no better proof than that furnished by a comparative study of the statistics of disease in the English troops serving in India and the native troops serving under the same conditions, with the exception of the ration, which for the English is as stated above and for the Indian a largely vegetable diet. The latter are immune from the great number of diseases so common in the English troops. Yet there is evidence, as will be alluded to further on, that the diminution of proteids can be carried too far, leading to great and widespread trouble. Concerning the navy ration, Surgeon Beyer concludes (Hygiene of the Navy Ration) that while it may be sufficient in proteids, fats, and carbohydrates, the sailor does not get what is on the bill of fare, owing to the waste and to the facts that the food is served badly and is not made palatable. Besides this there is a sameness in the ration, which should be changed. It is claimed that this was a cause of complaint during the late war, and hence a "war ration" is advocated. The final conclusions of the officer on this subject are as follows, viz:

1. Consolidate the messes into one general mess.
2. Train cooks in the art of good and economic cooking and supervise their work.
3. Commute all ships' rations whenever communication with markets on shore can be established.

4. Relegate the present ships' ration to the functions of an emergency ration (war ration), to be used only in cases of necessity.

5. Authorize a war ration.

Two papers on the subject of transport of wounded on shipboard, by Medical Inspector Gravatt, U. S. N. (describing a method of Lieutenant-Commander Mahan, U. S. N.), and by Medical Director John C. Wise, U. S. N., were presented.

These methods have hitherto been reported to the Bureau. Inasmuch as the records of the service in time of peace rarely afford an example of men being handled by methods involving suspension of the body, it is altogether probable that such a procedure will never be attempted in active warfare. The necessity for a hatchway that can be spared for this purpose, the difficulty of removing ladders, the complication of whips, blocks, and tackle, the dangers involved in suspension, all suggest the need of a simpler procedure whenever hand portage—generally the best—is found impracticable.

P. A. Surg. R. K. Smith, U. S. N., treated in a suggestive article "The care of the wounded on a modern ship of war." The unusual necessity of first aid is greatly emphasized by this officer. On a modern man-of-war, where men serve in such isolated positions as the tops, magazines, fire rooms, etc., the only aid the wounded are apt to get will be what can be rendered by those about them. Stations for the wounded, and operation, requisite material, and character of dressing are entered into in detail well worthy of careful consideration. The immunity of our Navy in the late war with Spain has led to a false sense of security in this regard, and immediate service to the wounded in naval actions has not been as systematically studied as it deserves to be.

Major Rio, of the Mexican army medical service, read, by proxy, an article on tetanus, especially as it affects inhabitants of the Tropics and troops serving therein. Of great interest was the statement that the cause of tetanus is associated with the common chigoe (*Pulex penetrans*) and the domestic fowl much in the same way that the *Bacillus pestis* is associated with the rat in China, being in other words a favorite intermediary for transporting the germ. Concerning treatment, officers serving in the Philippines reported good results in mild cases with ordinary antisepsis. Senn advocated parenchymatous injections of carbolic acid at the locality of the wound. The reports on serum therapy were very discouraging.

In view of the large land and naval forces maintained by the United States in the Tropics and Far East, the need of careful study as to the causes, pathology, prophylaxis, and treatment of the diseases peculiar to these localities has become urgent. So much is this the case with the British Government that it has organized commissions for the study of tropic fevers and epidemic diseases whose normal habitat seems to be among the old and crowded peoples of the Orient. Most important among such diseases is the bubonic plague. This subject was considered in a paper read by Passed Assistant Surgeon Wertenbaker, U. S. Marine-Hospital Service, entitled "The management of quarantine diseases and sanitary cordons." Incidentally, duties coming in this connection are incumbent on the naval medical officer.

The spread of the bubonic plague has necessarily caused concern in this country. In the past year the disease has reached Hawaii, really a frontier of our Pacific coast, while cases are from time to time reported in San Francisco. Of great interest as to the conditions favoring the spread of this dread disease is a letter written by Dr.

Charles W. Dabney in 1897 to the Supervising Surgeon-General U. S. Marine-Hospital Service, in which the writer dwells on the diet of those people especially liable to plague epidemics. Certain districts of London and New York are as crowded as Bombay, yet the former do not suffer in this respect. Dr. Dabney finds the cause in a dietary too low in caloric power to maintain life, the components being rice, which is very deficient in protein. In countries where the white and dark races live together in conditions approaching similarity, the immunity of the former is notable, and there can be no doubt but that the differences in diet must play an important rôle in this connection. The germ producing the plague has been unquestionably determined (Kitasato), and our knowledge of the conditions favoring and preventing its growth greatly advanced. It is admitted that the disease can be contracted by inoculation, inhalation, or through the digestive system. The bacillus infects food, water, clothing, and other personal effects. Rats are regarded as a special means of transmission, and it is said great mortality among these rodents presages an epidemic. The use of the serum of Yersin and Roux as a curative agent has given encouraging results. In Yersin's first experiments he treated 23 cases by the serum method, resulting in a mortality of 2.

For prophylactic use 10 c. c. of antipest serum (Yersin) should be administered to all exposed persons. This administration should be repeated in ten days. For curative purposes the serum should be administered in doses of 30 to 50 c. c.

The Haffkine material is for prophylaxis only. One cubic centimeter of this agent will confer an immunity which is slow in its confirmation, but of longer duration than that secured by the serum of Yersin. The *Bacillus pestis* is destroyed by all the usual disinfectants. It is killed by a temperature of 55° C. for five minutes, corrosive-sublimate solution 1–1,000, and 1 per cent solution of carbolic acid. The mineral acids are also reliable disinfectants. Sulphur fumigation is useful for general disinfection, as it destroys rats. Washing in bichloride solutions, boiling, and heat are the best agents in the disinfection of ships.

The limits of a brief report permit only an allusion to the value of the papers, discussions, and printed proceedings of this association. The latter have proved of great assistance to the officers of both services in the late war, and there is an increasing demand for them in foreign countries.

A METHOD OF TRANSPORTING THE WOUNDED ON SHIPS OF WAR.[1]

By John C. Wise, *Medical Director, United States Navy.*

The writer while fleet surgeon of the Pacific Station presented a paper with this title to the Association of Military Surgeons, but it did not appear, as the meeting was not held in 1898. It was therein contended that the most practicable transportation was that by hand—that no method involving suspension should be considered even when hand portage was undesirable.

There can be no question that occasions must arise when a resort to litters will be necessary. In settling which of those submitted is best adapted for the service we must ever keep in mind the complexities of modern naval construction. In our old type of wooden ship ladders were easily shipped or unshipped, being fastened by hooks to the coaming, but in modern ships the metallic ladders are bolted and riveted to the hatchway, making their removal difficult. Thus our problem is to send below a stretcher in a hatchway where the ladder remains, for, if the hatchway is clear, it is for uses other than those of the medical department. Under these circumstances the writer placed a slide consisting of two boards battened together over the ladder, and sent the stretcher below upon it. This stretcher consists of a piece of canvas 2 feet in width, between two poles, running in sleeves (the ordinary form). A steel-bar stretcher passes through the poles at each end, and fastens by a nut and screw. A broad thoracic band attached to the canvas (in two parts) is intended to encircle the chest and fasten, by a lacing with hooks, over the sternum. In use, the feet take against the lower steel stretcher, the bands are laced over the chest, and the patient is quite secure to be run down the slide. When not in service the stretchers are unscrewed at one end, laid parallel with the poles, and the apparatus is neatly rolled.

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[1] Read at the ninth annual meeting of the Association of Military Surgeons of the United States, New York City, May 31–June 2, 1900.

A board of officers reported as follows on this method:

1. Simplicity, speed of application, manipulation, and transport.
2. Ease of stowage.
3. Usefulness for shore transportation.
4. Security of the occupant.
5. Suitability to present ship construction.

In the battle of Manila Bay the aids to wounded handled by this method the few wounded with great ease and comfort, and it is believed to represent the simplest solution of this question.

In a prior paper it was maintained that suspension methods will not be used in naval engagements, and no mention of them can be found in the literature of the American-Spanish war. It is quite true that the American squadrons, both at Manila and Santiago, were not taxed by their own casualties, but in the latter engagement the large number of Spanish wounded were cared for by the Americans. It has always been stated by writers on this and kindred topics that the number of casualties in naval actions of to-day would be greatly increased; the results in the actions alluded to by no means disprove this assertion—true it is that the loss all fell on the Spanish side. At Santiago the enemy made no stand, yet he was terribly punished in a running fight. At Manila the result was much the same; the destruction of life on the flagship *Reina Christina* and the *Castilla*, receiving the brunt of the American fire, was appalling. Of the three medical officers carried on Admiral Montojo's flagship one was killed and another wounded, while the general casualties reached 50 per cent of her complement.

REPORT ON THE SANITARY RELATIONS OF THE PHILIPPINE ISLANDS TO THE NAVAL FLEET.

By Medical Inspector Remus C. Persons, *United States Navy.*

The Philippine Islands, being situated entirely within the Tropics, offer a group of problems in regard to the comfort and health of the personnel of the naval vessels in their waters, some of which can already be estimated, while others must await time and experience to solve them. These problems may be to some extent disregarded by vessels passing or only making a short stay, but are of serious moment where vessels may spend years in their midst without a wholesome change to cooler and bracing climates, for if they do go North in the summer the weather may be of such a character as to render but little change as to heat and humidity possible, and it will not be practicable to send all vessels North in the winter; or the stay to the northward be too short, on account of the exigencies of the service, to rebuild the systems long subjected to the heat, humidity, bad food, and the monotony always prevailing. Bad food is the only one of these causes at present removable, and at present only when the vessels are in proximity to one of the refrigerating ships with its cargo of fresh meats and ice; for to the vessels at the extremity of the islands this opportunity but seldom occurs, as distances are great and the demand for the presence of vessels at their posts constant, so the crews must live on the Navy ration, with what few fish they may be able to catch, for fresh fruit and vegetables are not obtainable, and these islands are not meat producing.

In the rainy season heat and humidity are high, more so in the early and late summer than in the winter, but even then the winter is only cool to those of attenuated blood. On shipboard there is practically little difference. The humidity is always high, but remarkably so during the rainy season, when the southwest monsoon brings great masses of water to be precipitated during four months of the year. As some compensation for this, however, the clouds veil the sun and shut off a good deal of the heat, but it is a question whether or not this is a real gain for men afloat, for in dry weather most of the people stay on deck, where they have the cooling effects of the passing breeze, but the rain drives them under cover in the warmer air below decks, where they are soon reeking in perspiration, which is a constant condition, and which, in a nearly saturated air, does not evaporate and cool the body.

It is the opinion of all the officers with whom I have talked that it is more comfortable in the lower islands than about Manila; that there is less heat, less rain, and more constant and cooler breezes. These conditions naturally obtain in the stations around the northern end of Luzon. On shore it is more comfortable than on shipboard. The houses are built above ground, with large doors and windows, through which the winds have a clean sweep, and contain no fireplaces or ranges to add to the heat that nature produces. There are many places where the thermometer ranges higher than in these islands, but few where naval vessels go equal the combination with humidity with its oppressive sultriness. In cyclonic disturbances the precipitation of rain is great, as much as 47½ inches having fallen in July of last year. As the rain falls the air is cooled, and after three or four days of steady fall the temperature is very pleasant, and woolen clothes are comfortable, and on shore a light blanket is desirable, but with the passing of the cyclone the temperature soon resumes its natural degree.

During these heavy rains men whose work exposes them to the weather become drenched, notwithstanding their oilskins, and remain so as long as they are exposed. When drainage is not good on account of low-lying lands, as in the vicinity of Cavite naval station, the soil becomes so saturated that the water lies on the surface until the lessening fall toward the end of the season allows the percolation to drain the surface. Water in the dry season can always be obtained within 2 feet of the surface, so that there is no suitable place for a cemetery, and makes the site of the old Spanish naval hospital undesirable. The soil is very porous and the tides influence the height of the subsoil water. During the rainy season stone and plaster walls become damp, and mold collects and grows rapidly. The heat and humidity being continued throughout the year, prove relaxing to the system, and flesh and strength are lost, and the weak points of an individual are soon apparent in the confinement of ship life. The men most affected are those whose duties keep them in the hotter portions of the ship. They are also more subject to skin troubles, and suffer a great deal from rashes, as prickly heat, eczema, and from pemphigus, which is quite common, particularly affecting the axillæ.

Among the most important factors are water, food, clothing, prevention of communicable diseases, ventilation, the many little points that make for health and comfort ashore and afloat, and the length of a cruise in these islands. That we are now in a state of war with the natives makes the conditions harder than they will prove when all ports can be freely visited and such articles of food as are raised can be bought by the vessels on isolated stations.

For the larger vessels the problem of water is solved by the distilling plants on board, but for the small vessels without distillers, on distant posts, the question is a serious one. As long as it will be necessary to patrol the coasts, and until the many thousands of miles of coasts and proximal waters be surveyed, small vessels will be removed from opportunities to procure distilled water for drinking purposes, and must rely only on boiling procurable water, as they are not supplied with filters, for in all the islands the water is supposed to be disease bearing. During the rainy season a sufficient quantity of water can be caught, but even this should be filtered and boiled. During eight months in the year rains can not be depended on, and for obvious reasons it is not desirable to use water collected from the shore, for where the destruction of organic life is so great and continuous, and among a people who disregard all sanitary laws, waterborne diseases are common. The water supply at Manila is said to be good, but all American families on shore filter and boil it before drinking. At Port Isabela, Basilan, the water supply is highly spoken of, but in all places the water should be at least boiled.

The question of food is one that will demand attention for years after hostilities cease. At present, away from the larger ports, vegetables and animal food can not be obtained, and the fruit supply is very limited. The natives are rice eaters, and very little else can be obtained from them. Beef and mutton are not raised. The Philippines are not meat producing. The carabao meat is very coarse and tough, and unsuitable for food. Chickens and eggs used to be plentiful, but very little attention has been paid to chicken raising since the war commenced, and the supply on hand has been nearly exhausted by the forces on both sides; and nearly all eggs obtainable in Manila are brought from China.

The refrigerating ships, with their most excellent beef and mutton, have proved the greatest boons to all within the radius of supply. These meats are liberally supplied to the men, and officers' messes are allowed to purchase them at cost prices, so that all have had enough and to spare of as good meat as can be obtained anywhere and of much better quality than can be obtained in the West Indian markets. An army vessel at Iloilo issues to the vessels in that vicinity. Ice is supplied by these vessels also in liberal quantities, but on account of the small space for storing ice only a three or four days' supply of meats can be carried by the smaller vessels, for the temperature of meat must be kept very low or it spoils in a very few hours, even when freshly killed. The larger vessels can not do much better, as the ordinary cold-storage plant does not work well where the temperature of the sea water is too high to keep the condensers cool; so canned goods must be relied on for most of the cruise, and as some of the vessels are away from the base of supplies for months it can be imagined how fresh food is appreciated when it can be obtained. The waters abound in fish, but their food being so plentiful they are hard to take by hook and line, and it is not safe for seining parties to go inshore. Occasionally they can be bought from native fishermen. All varieties are not edible, and cases of poisoning not infrequently occur. About Manila good oysters, shrimp, and lobsters can also be obtained, and the supply of fish in the markets is most excellent, as the waters of the bay teem with them and the natives take them in weirs.

Only a few of the common vegetables are grown by the market gardeners, and they are usually of an inferior quality and in limited supply. All vegetables which are not cooked should be regarded with suspicion as carriers of typhoid or dysentery, and diligent inspection of bumboats made to exclude such, as night soil is more or less used in their cultivation, and even a good washing of such vegetables in distilled water does not always render them innocuous. As to fruit, bananas can be had the year round, but are mostly of inferior quality; and mangoes, pineapples, and oranges in season. Pineapples are of fair quality. The mangoes are said to be the best in the world, and are highly relished by all who spend a season in the islands. They are large, luscious, sweet, and entirely free from any suggestion of turpentine. The oranges, on the contrary, are of very little account. It is a matter for wonder that fruit and vegetables have received so little attention in cultivation, for many of the most prized tropical fruits are unknown here, although growing abundantly in other of the Pacific islands. Soil and conditions are good for raising all kinds of fruit and vegetables, for on the higher mountain levels those of the temperate climates should do well. While too much of a meat diet in this climate is undesirable, it is certain that the Anglo-Saxon needs a liberal supply wherever he may go. The power of resistance of the rice-eating natives along certain lines is poor. He may stand the heat and humidity better and be comfortable where a white man is not, but he yields much more quickly to such diseases as beri beri and plague, and in ordinary cases collapses quickly when the limit of resistance is reached, and this limit is not at so advanced a stage as with a meat-eating people. Fresh milk can not be obtained, which is a misfortune for the sick. A fine quality is brought in sealed copper cans by passenger steamers from Australia for use on board during their round trip to Yokohama and return. It is pasteurized and keeps indefinitely, and has the taste and freshness of recently collected milk, and is most grateful to patients on a liquid diet. It would meet a long-felt want if a supply of this milk could be brought on the refrigerating vessels from Australia for use of the sick.

Cotton clothing is best adapted for ship's use. Each person should have several suits for suitable shifting. Exposure to rain does not affect the individual as in a cool climate, provided he shifts into dry when coming out of the wet. It acts merely as a prolonged bath. It is usually the extra heat in the fire and dynamo rooms that predisposes to catarrhal and rheumatoid diseases. On completing his tour of duty, reeking with perspiration, the individual is apt to expose himself to drafts when possible, which sometimes give trouble. A suit or two of woolen is also desirable on the third or fourth day of a typhoon, when the damp air becomes chilly. On shore, where quarters have no fires and are much open, warmer clothing is necessary both day and night during the rainy season, and it is then that a mattress bed is comfortable to the sick and a light covering grateful. Change into blue is not made at sundown, as is the custom in the West Indies, and I have never seen any harm come from wearing white day and night. It is the native dress ashore and afloat, summer and winter.

The prevailing diseases are of the various types of fevers; of rheumatism, dysentery, and diarrhea; of heat exposure, skin disorders, smallpox, beri beri, plague, and other diseases which are common everywhere, including the ever-present venereal troubles and alcoholic addiction.

Dengue and thermic, malarial, and typhoid fevers exist throughout the group of islands; nor is it to be wondered at, since no attempt at sanitation has been made outside of the Spanish-dwelling cities. Few places have water supplies or sewerage of any kind. The water-closet system is practically unknown, cesspools or privies above ground being the rule, and in native towns anywhere that is convenient. Most of the coast towns lie so low that but an imperfect system of drainage is practicable at the best. This includes Manila, Cavite, Cebu, Iloilo, and Zamboanga. The latter has a fine, large stream of water running through it, into which refuse is dumped. In Manila there are several small tide-water canals, with a very sluggish flow, emptying into the swiftly flowing Pasig. At low tide the water drains out and leaves their foul bottoms exposed until the incoming tide refills them. It is in the closely built walled town and in the Chinese quarters of the new, where the houses are built on the ground and are huddled together, where the plague has chiefly existed. In both the conditions are favorable for its continuance, despite all vigilance. There have been cases in more healthful parts of the town, where houses are built above the ground, and also in the open country, but no doubt the exposure was elsewhere. Up to this time there have been only two cases occurring in white persons, two army teamsters who were closely in contact with Filipinos and whose habits were filthy. All other cases have been of Filipinos and Chinese, of which Manila has a large proportion, and who have furnished the larger number of cases.

The mortality has been about the same as at other plague-infected centers. It has been diligently fought, both at Manila and Cavite. In Cavite the houses are also built with the lower story on the ground, in which many people are huddled, and it was among them the cases occurred, all fatal. There have not been any cases among the whites. The town was cleaned thoroughly while under charge of the marines, and new drains opened. The plague has not become epidemic, but the recognized cases have been so widespread as to lead to a belief that it is endemic, and that conditions have not become ripe for its becoming epidemic in the islands. One case of plague occurred on one of our vessels, the *Austria*, at Hongkong, in the person of a Chinese mess attendant. It was promptly recognized, sent ashore to the plague hospital, and the vessel promptly disinfected and painted. The case died in three days, a post-mortem examination revealing the bacillus of plague. All through these towns and in the country fevers of all kinds exist. A severe type of dengue is common, and in Cavite very few escape it. Fortunately it does not prove fatal, although it is often very distressing. There malarial fever is uncommon. There are no pools of stagnant water in which mosquitoes can breed, and when it appears the plasmodium is evidently imported. In many sections of the lower islands it exists at its worst, and often proves quickly fatal. Smallpox is so widely spread as to be little regarded, and in some parts is considered by the natives as an almost necessary disease of childhood, and no attempt is made to keep it from spreading. A vaccine farm has been established in Manila, affording excellent virus from the native carabao, and compulsory vaccination has been established in Manila and many of the captured towns, and it is hoped to check its further spread, but it will require time to immunize eight or ten million people. The personnel is frequently gone over, so that only a very few cases have occurred among naval ships during the two years of our occupancy of these islands.

Rheumatism stubbornly resists treatment and relapses are common, and when once the disease obtains a good foothold the subject's usefulness is gone and he should be given a change of climate. Whether this change can not be obtained at a suitable elevation in the mountains is a question which should be solved as soon as peaceable conditions in the country will admit. Diarrheas from many causes are common, but quickly yield to suitable treatment.

Dysenteries, on the other hand, may be either quickly fatal or run into a chronic condition. The latter is of the amœbic variety, and although sometimes fatal its tendency is to run into the chronic form when not promptly cured. The acute and generally fatal form is due to a specific bacillus. It is not as common as the amœbic form, which is fortunate, for it is very sudden and overwhelming in its action and may prove fatal in three days. Post-mortem examinations show extensive changes, with great inflammatory thickening of the walls of the bowel. I have not seen any of these cases, but am indebted to Captain Strong, of the army medical corps at the First Reserve Hospital, Manila, who has had exceptional opportunities for its study at the bedside and bacteriologically, and who kindly showed me the anatomical specimens of the disease and of the bacillus causing it. When not fatal the tendency is to complete recovery.

Beri-beri is one of the common diseases of the natives and most often proves fatal, if its ravages among the Filipino prisoners held in Cavite are not exceptional, where the fatality was so great, notwithstanding treatment by Filipino physicians, that the rest were liberated to prevent the further spread. Very few white people have contracted the disease, and none who live on board ship.

Venereal troubles abound as elsewhere, but show no special virulence. Fever after exposure to the sun often occurs. Heat stroke has proved fatal on shipboard in two cases, in one the temperature rising to about 110° F., the second to 112° F., which was the limit of the thermometer, the belief being that it was higher. Heat prostration in the firerooms is common. There are many insect pests on shore, as mosquitoes, and the different forms of itch. It is not known whether or not the former are malaria breeding, but it is certain that they are voracious and poisonous. The "dhobie," or washerman's itch, finds its way on shipboard and is quite common and annoying, but the insect is easily killed. The variety locally known as sarna makes deep and excessively painful sores, which are hard to heal. To most of the above diseases people living on shipboard are not exposed, and they can be avoided by liberty parties by the exercise of a little prudence, but unfortunately the temptation to drink is great, and, given away to, prudence cases to exist. At present liberty is restricted to the daytime, but many break their liberty and remain away for days, and consequently are much exposed. Other affections also exist, and it will require thorough study, possibly for years, to determine their causation, clinical history, treatment, and prevention. Yellow fever and cholera do not exist, nor is famine likely to occur.

Houses throughout the islands are built to keep the heat out, and are not heat producing, as no provision is made for fire. Ships, on the contrary, are tightly built and produce a great deal of heat, as coal must be burned not only for steaming purposes but continually at anchor for distilling, electric lighting, and ice making, running ventilating fans, and the like, and the consequence is that ships are much warmer than houses. To insure the greatest efficiency of the personnel, ships should be selected for work in the Philippines that are built as open as possible, to insure the escape of the greatest amount of heat. As it is, the heat necessarily permeates the ship, and in some parts renders the sleeping quarters unbearable. Just as an individual may have a winter and a summer home, so should the Government build suitable vessels for this work, for there is no escape from a high temperature so long as a vessel is on this duty, and being continuous it tells on all after a while, but first among the ones employed in the fire and dynamo rooms, the force in which should be large, so as to keep a large proportion off duty. There should be large open hatches with wind sails, large side ports, air scoops fitted in large air ports, and a ventilating apparatus of the best design and of a sufficient power for blowing in a large amount of air. Double awnings should be provided and kept spread, and everyone allowed to remain on deck in the day when not on duty and to sleep there when practicable. There should be an efficient distiller and an ice plant of sufficient capacity to supply the immediate needs of the ship and keep the cold-storage rooms cool; running water for shower baths for the ships company, and well-ventilated water-closets.

The length of a cruise in the Philippines should be limited to two years at present, and only strong and robust persons should be selected for the duty, the weak points of others soon showing, incapacitating for duty, and rendering medical surveys frequent. Many persons have been returned home who have rendered very little effective work on the station. The squadron is weakened and additional work has been thrown on others, for there is plenty of work which must be done. If possible each ship should be sent north every year for a change, but although it will not be practicable to get them all in cool weather, the change will be good for the mental condition, for no matter how well a man may be he fancies such a change necessary for his health.

Shore duty at the different stations here should be counted a cruise, and it will be better if a part of a tour of duty can be spent on a cruising vessel. When the tour has been finished all should be ordered home and given duty where they can pass at least one winter in a cold climate. It is principally the dread of the third year here that makes the duty so unpopular, for unpopular it is, and the mental status causing it is one of the most serious conditions with which we have to deal. A strict roster should be kept, and everyone in the service in good health should take his turn. As soon as it is determined where the principal naval station is to be, a suitable modern hospital should be built, in large grounds in a well-selected location, sufficiently elevated to secure good drainage. There should be all necessary outbuildings, detention ward, contagious-disease ward, a fumigating house, a laboratory, deadhouse, stables, suitable separate quarters for medical officers, for the hospital corps, and for civilian employees. The hospital should be on the pavilion plan, one story in height, raised on stone or brick arches five or more feet from the ground, so the wind can have a free sweep below; the walls should be of brick or stone, with large doors and windows, and well secured to resist earthquakes and typhoons. The roof should be doubled, tiled on the upper side, with a free open space between, and should have free ridge ventilation; a wide veranda should extend around each ward and be fitted with blinds that can be opened and closed to keep out the driving rains while allowing the air to enter freely. The floors should be tiled and the lighting be by electricity. There should be a plentiful water supply in convenient bathrooms, and bath tubs on wheels to be easily taken to the patient's bed, for nowhere can water be used to better advantage in the treatment of fevers. The administration building, containing also the dispensary, should be separate, and the operating room attached to the surgical ward. The kitchen and mess hall should be convenient. A small special diet kitchen with an electrical stove should be attached to the ward. The bedsteads should be of iron with steel springs, well painted, and mattresses supplied as at home. As little wood as possible should be used in the fittings, so as not to harbor ants and roaches, and when used should be of hard-wood of the country, and in no case should it be connected with the ground so that white ants can enter.

The laboratory should be large and perfectly fitted with every requisite to study tropical disease, and trained bacteriologists with zeal detailed for that especial duty. A distilling and ice plant with facilities for carbonating water should be erected, and an electric plant connected therewith sufficiently large to meet all requirements.

As it will not be possible to secure fresh milk, a dairy should be established with cows sent from the warm climate of Lower California which should thrive here. Fresh milk will prove a most valuable aid to treatment in dysentery and fevers. A well-stocked library should be provided, and facilities for both in and out door amusements.

There are many patients requiring a change of climate, especially those convalescing from fevers, dysentery, rheumatism, and the like. At present many of these are invalided to the hospital at Yokohama, 2,000 miles away, or Mare Island, 7,000 miles. A sanitorium, built in the mountains of the island, well elevated and of comparatively easy access from the main hospital, in a salubrious climate, and where supplies can be obtained from the surrounding country, will in a great measure do away with the necessity of sending patients to Yokohama. Much thought has been given to the subject of a hospital ship, and while it has many advantages, a perfectly equipped hospital ashore has many more, and money should not be spared in making it as complete as possible in every detail.

There are smaller shore stations at Olongapo, on Subig Bay, and at Port Isabela, Basilan, where a force of about 150 men each is stationed. At each station is a medical officer, hospital steward, and apprentices. If these are to be made permanent stations and the forces increased, the sick bays should be fitted with all necessary comforts and conveniences as small hospitals. In addition to their regular duties the medical officers at these posts are called upon to treat all the sick natives in the adjacent villages and country, which makes their work very arduous. Most of the natives are very poor and are unable to pay for medicine or physicians, were they to be had; but there are neither in either place, so that charity must be bestowed on them or they suffer and die without. As the supply of medicines to the marines at these stations is small it is recommended that a small sum of money be asked as an appropriation by Congress for medicine for the needy sick until the natives are able to attend to their own wants.

SANITARY REPORT ON GUAM, L. I.[1]

By Philip Leach, *Surgeon, United States Navy.*

The isle of Guam, situated in latitude 13° 26′ 27″ N., longitude 144° 43′ 30″ E., is of coral and volcanic formation uplifted by mountain folding. A narrow strip of low, more or less marshy land forms the greater part of the coast line and incloses a hilly country with broad elevated plateaus lying between the peaks, the highest of which does not exceed 1,000 feet above the sea level. Broad expanses of grassy uplands, wooded hills, cocoanut groves, and cultivated fields, varied by bold headlands and rugged peaks, and inclosed by the blue Pacific, make a very pleasing landscape.

The climate, though good for the Tropics, is debilitating to people reared in the Temperate Zone. So far as can be ascertained, it would appear that the mean temperature for the year is about 77°, with but little variation, of course, for the different seasons. Practically, we find that the winter months are the least trying from the heat, for though the days are hot, there being more sunshine than at other seasons, the nights are so cool that one needs to sleep under blankets. And it is at this season that the refreshing northeast trade winds are the most constant, and there is relatively little moisture in the air. There are two seasons, the dry and the wet. The dry season extends from November or December to June or July, with frequent showers, however, in February, and at this time the climate is as agreeable as could be expected in a low latitude, the early morning, the late afternoon, and the nights being delightful. But the remainder of the year, from June to December, is subjected to a heavy and almost constant rainfall, which seriously limits open air life and exerts a depressing influence over the spirits, atoned for somewhat, however, by the remarkably brilliant atmospheric effects to which the eye is daily treated.

The capital, Agaña, and almost all the villages are built on the low, flat strip of land that skirts the coast and rises from 4 to 12 feet above salt water. Here the soil is extremely porous, large collections of water from a heavy rain being absorbed with great rapidity. Sewerage and drainage systems do not exist. The well-to-do people have privies built in the walls of their houses or dug in their yards, while the excreta of the poorer classes are deposited on the ground of their premises and left to the absorptive soil and the pigs. Drinking water is drawn from shallow wells placed in this porous soil close to the privies, or from cisterns so constructed as to be easily polluted. The conditions favorable to the dissemination of diseases attributable to infected water are therefore sufficient to account for the prevalence of such diseases.

The dwellings as a rule are sufficiently hygienic in structure, excepting, of course, those in which the privies are built in the walls, but they are generally overcrowded, and in the towns, but not in the country, it is the practice at night to close all of the windows and doors. Foul, hot air is the consequence.

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[1] This report covers the period from August 7, 1899, to December 31, 1899.

With such an environment—easily polluted water, overcrowding, and filth—it is not remarkable that an infectious disease when introduced should rapidly spread and result in a high mortality. Before a quarantine system was established devastation of the public by diseases brought by infected vessels was of rather frequent occurrence. An instance of this occurred last spring before the establishment of the present government, when the Spanish transport *El Cano* brought a disease supposed at the time to be cerebro-spinal meningitis, but now believed to have been acute anterior poliomyelitis.

On the arrival of the expedition on the *Yosemite*, the 7th of August, the palace, now called Government House, and the barracks and other public buildings at Agaña, which were vacated by the Spanish, were with much labor put in order for our force. An evaporating plant was erected and a system of sewers provided for the Government House and the barracks. A small hospital was established, which proving inadequate in such an unhealthy place, will be moved to a more commodious building recently engaged for the purpose. The insanitary features of the town have been described in a previous paragraph. Typhoid fever being epidemic among the natives speedily made its appearance in our force notwithstanding the supply of distilled water, access directly or indirectly to polluted water being inevitable. To this date 25 cases, resulting in 4 deaths, in a force of 150 men, have occurred. The disease is of the type generally seen in tropical and subtropical countries.

The unhealthy conditions existing at the capital will not obtain at the proposed coaling station on Cabras Island, which is about 6 miles from Agaña The island never having been inhabited is free from the effluvia given off by the filth-soaked soil of the towns, the natural facilities for drainage are all that could be desired, there is constant exposure to the prevailing sea breezes, and an ample supply of water, shown by analysis to be suitable for all the purposes of a naval station, can be readily obtained from the neighboring Masso River. The far greater salubrity of Cabras Island as compared with Agaña is shown by the excellent health record of the *Yosemite*, which lies near Cabras. There has been no typhoid fever or any other serious disease on the *Yosemite*, and the sick list, when large, has been due to trivial accidental causes, not to unhygienic or epidemic influences.

Although the isle of Guam is fertile and capable of sustaining a much larger population than now exists, it is a fact that, under present conditions, the food question gives much trouble to natives as well as foreigners, and sometimes causes considerable anxiety. Beef is not plentiful and is of poor quality, and there being no cold-storage plant it must be eaten soon after it is killed. There is no mutton, the diet of the hogs bars pork in its various forms from the foreigner's table, white potatoes do not grow, and the few other vegetables of our climate that thrive here are raised in but small quantities. Fruit of all kinds is scarce. Chickens, eggs, an inferior kind of sweet potato, breadfruit, canned meats and vegetables, and the tough, flavorless beef constitute our unsatisfactory diet. An occasional visit from a refrigerator ship with a supply of beef, mutton, and white potatoes would be a blessing.

During the interval between the Spanish evacuation and the arrival of the *Yosemite* the country was without physicians and medicines, and it would appear that even during the Spanish period but little attention was given to the medical wants of the people at large. The medical officers of the *Yosemite* began at once to interest themselves in the sick and injured. During the four and one-half months covered by this report there were treated 427 civilian patients whose diseases are classified in accordance with the method of the Bureau of Medicine and Surgery, as follows:

PARASITES AND PARASITIC DISEASES.

	Number of cases.
Ascaris lumbricoides	13
Taenia	5

GENERAL INFECTIOUS DISEASES (NON-VENEREAL).

Febris enterica	18
Febris intermittens	5
Febris pneumonica	1
Parotitis epidemica	3
Tuberculosis pneumonica chronica	8
Tuberculosis of joints	1
Tuberculosis of skin	1
Lepra	6
Poliomyelitis anterior acuta (of adults)	17

CONSTITUTIONAL DISORDERS OF NUTRITION.

Anæmia	3

DISEASES OF THE NERVOUS SYSTEM.

Cephalalgia	3
Dementia	1
Dementia paralytica	2
Epilepsia	1
Neuralgia	1
Neurasthenia	1
Paralysis syphilitica	5
Sciatica	3
Sclerosis multiplex	1
Sclerosis spinalis posterior	1

DISEASES OF THE VISUAL APPARATUS.

Conjunctivitis	1
Iritis syphilitica	1

DISEASES OF THE AUDITORY APPARATUS.

Otalgia	1
Otitis media	2

DISEASES OF THE DIGESTIVE APPARATUS.

Ani prolapsio	2
Catarrhus gastricus acutus	19
Catarrhus gastricus chronicus	19
Catarrhus intestinalis acutus	13
Catarrhus intestinalis chronicus	4
Cholera infantum	16
Constipatio	2
Diarrhœa simplex	5
Fistula in ano	1
Hæmorrhois	1
Hepatis congestio	1
Hepatitis acuta	1
Peritonitis	1
Odontalgia	3

DISEASES OF THE CIRCULATORY APPARATUS.

	Number of cases.
Cordis valvularum morbus	3

DISEASES OF THE RESPIRATORY APPARATUS.

Bronchitis acuta	11
Bronchitis chronica	15

DISEASES OF THE MOTORY APPARATUS.

Arthritis	1
Myalgia acuta	4
Myositis (thigh)	1
Sinus (foot)	1

DISEASES OF THE CUTANEOUS APPARATUS.

Carbunculus	1
Cellulitis	2
Eczema	1
Herpes simplex	2
Impetigo	3
Ulcus	4
Ichthyosis	3
Tinea circinata	6
Other skin diseases, diagnosis doubtful	2

VENEREAL DISEASES AND DISEASES OF THE GENITO-URINARY APPARATUS.

Cystitis	1
Gonorrhœa	4
Nephritis chronica	1
Syphilis consecutiva	122

CYSTS AND NEW GROWTHS.

Chondroma	1

INJURIES.

Contusio	3
Hernia	1
Vulnus incisum	7
Vulnus punctum	1
Vulnus sclopeticum	1

EXTRANEOUS BODIES.

Corpus extraneum	1
Diseases unclassified and lost sight of	10

GYNÆCOLOGICAL DISEASES AND OBSTETRICAL CASES.

Abscess of breast	1
Abortion	1
Eclampsia, puerperal	1
Hæmorrhage, post partum	1
Labor	3
Metritis, septic, and peritonitis	1
Metritis, chronic	2
Metrorrhagia	1

The following summary shows by percentages the relative frequency of the various classes, excluding, however, gynæcological and obstetrical cases and diseases set down as unclassified and lost sight of:

	Per cent.
Parasites and parasitic diseases	4.5
General infectious diseases (nonvenereal)	14.8
Constitutional disorders of nutrition	.8
Diseases of nervous system	4.6
Diseases of visual apparatus	.5
Diseases of the auditory apparatus	.8
Diseases of the olfactory apparatus	
Diseases of the digestive apparatus	21.6
Diseases of the circulatory apparatus	.8
Diseases of the respiratory apparatus	6.4
Diseases of the motory apparatus	1.7
Diseases of the cutaneous apparatus	8.3
Venereal diseases and diseases of the genito-urinary system	31.5
Cysts and new growths	.3
Injuries	3.2
Extraneous bodies	.2

The relative frequency of the more important individual diseases that are always in the island is shown in the following table in percentages of the total number of diseases less those unclassified and the gynæcological and obstetrical cases.

	Per cent.
Typhoid fever	4.43
Malarial fever (intermittent)	1.23
Tuberculosis of lungs and other organs	2.46
Leprosy	1.47
Heart disease, organic	.73
Bronchitis, acute and chronic	6.40
Brights disease of kidney, chronic	.24
Gonorrhœa	.98
Syphilis, chiefly hereditary, including paralysis	31.28

Typhoid fever, which is included in this table, is endemic. It is probable that the island has not been free from it for many years.

Diseases classed as malarial are to be regarded as due, possibly, to some other cause. Manifestations presumed to be malarial are very rare, and it is not certain that malaria exists at all in the island. There are at present no facilities available for making bacteriological diagnoses or blood examinations.

Leprosy is less common than was supposed. At the close of the Spanish administration there were 19 registered cases, which, it was believed, embraced all in existence. Since that period 5 lepers have died and no new ones have come to light. It is almost certain that the disease is not on the increase. It is believed to have been introduced here by Chinese immigrants.

The syphilitic cases are probably almost all hereditary. No cases of primary or secondary syphilis have been seen, and of the 127 cases treated not one gave a history of primary or secondary symptoms. It is not uncommon for more than one generation of the same family to be under treatment simultaneously. Ulcers, gummata, and joint and bone lesions, many of which have been very destructive, are the chief types. A few instances, however, of syphilis of the central nervous system have been seen. The extraordinary success attending the treatment of these unfortunates has been most gratifying. Excepting the paralytic cases, all have responded promptly to the appropriate treatment. And it matters not whether mercurials or potassium iodide, or both, be employed, or whether the dose be large or small, the same rapid results are obtained. It is safe to predict that, could all districts of the island receive the benefit of this treatment, the lesions that now too commonly offend the eye and nose of the traveler would in a very few years entirely disappear.

The following operations, almost all of which required general anæsthetics, have been performed (cases included in the foregoing classification):

GENERAL SURGERY.

1. Laparotomy for general peritonitis from abscess of liver. (Death.)
2. For compound comminuted fracture of humerus involving elbow joint, and extensive burrowing of decomposing pus in leg, both from gunshot wounds, and complicated with septicæmia, removal of splinters from arm and insertion of drainage tubes, and opening by incision sinuses of leg and insertion of drainage tubes. (Death from septicæmia.)
3. Bassini's operation for radical cure of complete oblique inguinal hernia. (Cured.)
4. For large carbuncle of chest of child, free incision, curettage, and insertion of drainage tubes. (Cured.)
5. For extensive syphilitic ulcers and abscesses of leg, incision, curettage, and packing. (Cured.)
6. For extensive syphilitic ulcers and sinuses of scapular region, incisions, curettage, drainage tubes, and packing. (Cured.)
7. For very extensive syphilitic ulcers of leg, curettage. (Cured.)
8. For old sinus of foot, incision and curettage. (Cured.)
9. For extensive ulcer of gum, incisions. (Cured.)
10. For extensive abscess of scalp and neck, incisions, curettage, and packing. (Cured.)
11. For deep traumatic abscess of thigh, incision and drainage. (Cured.)
12. For cellulitis of foot, incision and drainage. (Cured.)
13. For small incised wound left knee, sutures and aseptic dressing. Union by first intention.
14. Removal of splinter (1½ inches long) from between the second and third metatarsal bones by incision. Irrigation and packing. (Cured.)
15. Incised infected wound 6 inches long, right kneejoint. Cleansed and sutured. (Cured.)

GYNÆCOLOGY AND OBSTETRICS.

1. For septic metritis and consequent peritonitis, irrigation and packing of uterus. (Cured.)
2. For extreme post-partum hemorrhage, incision, irrigation, and packing. (Cured.)
3. For transverse presentation, arrest of labor, extreme hemorrhage, and death of child, podalic version. (Recovery of mother.)
4. For abscess of breast, incision and drainage. (Cured.)

All of these cases, medical and surgical, were treated in Agaña, the capital, and the widely separated villages Piti, Sumay, and Agat. The population of these places is as follows:

Agaña	5,475
Piti (including Tepungan)	214
Sumay	536
Agat	790
Total	7,015

Other villages and districts requiring medical and surgical aid are so far from the harbor and the capital, and roads to them are so bad, that with the present force of medical officers and assistants it is not practicable to regularly visit them. In conclusion I desire to express my appreciation of the services of Asst. Surgs. Mack V. Stone and Alfred G. Grunwell, both of whom deserve much praise for the energy and intelligent zeal displayed under trying difficulties in the prosecution of this work.

REPORT ON TEMPORARY NAVAL HOSPITAL AT TAKU, ESTABLISHED DURING RECENT DISTURBANCES IN CHINA.[1]

By CORBIN J. DECKER, *Surgeon, United States Navy.*

On Saturday, the 16th of June, 1900, the *Monocacy* was moored alongside the river bank above the railroad station at Tongku, about 1½ miles in average distance from the Taku forts. At 12.45 a. m. on the 17th these forts opened fire on the fleet in the river. There was a Japanese gunboat aground a quarter of a mile above us. Below, and nearer the forts, were in the following order a Japanese torpedo boat, a French gunboat (the *Lion*), six Russian gunboats, then two English torpedo-boat destroyers (the *Fame* and *Whiting*), the German *Iltis*, and, ahead of all and nearest the northwest fort, the English *Algerine*. All of the gunboats were of comparatively light draft and ranged from 1,000 to 1,800 tons displacement and were mostly lightly armed. Several of the Russians had old-fashioned 6-inch breechloaders, but the newer ships had rapid-fire 4-inch guns and a pretty heavy secondary battery. There were several merchant steamers at the Tongku coal wharves, but they were fortunately pretty well protected by the great stacks of coal lying between them and the forts. The four Russians most remote from the *Algerine*, together with the French *Lion* and the Japanese torpedo boat, were tolerably well protected as to their hulls by the river bank and the Taku mud village.

In addition to the gunboats in the river the "allies" had about 900 men on shore who had been landed on the morning and in the evening of the 16th. Of these, 300 Japanese were at Tongku in camp near our ship. The rest, for the most part English and Germans, were in camp just above the first bend of the river and about three-quarters of a mile from the northwest fort.

It is stated that the Chinese did not notify the noncombatants before beginning the action. As soon as the Chinese opened fire the Japanese considered that they were attacked and immediately took part in the engagement.

The fleet in the river returned the fire vigorously, but with no apparent effect on the forts until 4.30 a. m., when the land force attempted to take the northwest fort, but were repulsed and retreated to the protection of the banks of a salt flat about a quarter of a mile to the rear. The *Algerine* and the *Iltis* then cooperated directly with the assaulting force by steaming up to the forts, within 200 yards of the northwest fort, and by a very rapid fire kept the Chinese from the fort walls, and the "allies" took possession on the run, the Chinese leaving by the opposite side. The *Algerine* and the *Iltis* then steamed down between the north and south forts, and a lucky shot from the *Algerine* exploded the main magazine of the south fort. This demoralized the Chinese, and they immediately abandoned these forts. A desultory fire from the more remote south forts was kept up until about 7 o'clock.

The loss of the Chinese was very light, not over 100 killed, and there were very few wounded found. The "allies" lost 108 killed and 123 wounded. These figures are not accurate, but are as given by the various commanders on the morning of the fight. I think it is safe to figure on these numbers as representing a minimum.

The ships most exposed were hit quite often. The *Algerine*, being low in the water, was hulled but once, but was repeatedly struck in the light upper works. The *Fame* was hit several times, but was not hurt seriously. The *Whiting* had a boiler exploded. The *Iltis* was struck 27 times in hull and superstructure and sustained the greatest loss in killed and wounded except the Russian commodore's ship. The latter was struck in the main shell magazine, which exploded and killed and wounded 67 men and sunk her, luckily in shallow water. She was later raised and repaired. The rest of the ships in the action were struck a few times, and all lost more or less in killed and wounded.

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[1] Date of this report is August 20, 1900.

The *Monocacy* was hulled by an 8-inch shell or solid shot, which passed through above the main deck. It struck just forward of the starboard wheel, smashed the starboard-quarter boat, went diagonally across the deck, and out through the port forecastle. Several men were struck by splinters, but none were hurt to any serious extent.

About 8 o'clock the wounded began to come in, and as our room was limited, owing to the many refugees and large quantities of stores of the various landing parties and their baggage lying about the decks, I only made a few major operations on board, doing most of the work outside in improvised tents. During the next sixty hours I operated on 18 Japanese, 23 Russians, and 16 Chinese. After the first five hours the patients were taken away immediately after operation. In some of the minor cases among the Russians and Chinese no anæsthetic was given because of its limited quantity at that time. In this connection it is interesting to confirm the stories of the stoicism of these peoples. Extensive shell wounds were cleaned, parts retrenched, bones cut and exsected, stitching done, finger and toe amputations endured without a murmur. In the case of one Cossack, I amputated the fourth and fifth metacarpal bones and the middle finger. Hand was considerably lacerated by a shell fragment. After the wound was sewed and dressing applied, I asked the man if I could do anything else for him. He said he would like to eat. We gave him a considerable quantity of food, which he devoured, and then thanking us, he joined his company to do duty.

By 2 o'clock the Japanese surgeons had a temporary hospital in working order, and took away their patients as fast as operations were done. The Russians embarked theirs in the evening and on the next day, and took them out to their ships in the bar fleet. Most of the Chinese were taken away in sampans by their friends, but we kept several a few days. One case, suffering from shock, I kept on hand until July 22.

The next few days all hands were constantly busy rushing men and stores forward to relieve Tientsin, as our force there was hard pressed from without, and firing could be heard night and day.

On the 29th the First Battalion of marines, 300 strong, with 500 Russians, got as far as Chen Li Ang Chen, halfway to Tientsin, where they joined a party of Russians holding a besieged camp.

On the following day an advance on Tientsin was made. Our force was driven back by the enemy, and we lost 3 killed and 3 wounded. Anticipating that we would have wounded, I suggested to the commanding officer the advisability of establishing a base hospital in one of the large buildings at Tongku within easy distance of the ship and railroad. This he approved and ordered me to put the matter before the admiral at once. I went out to the flagship *Newark* and was directed by the admiral to open a hospital in Taku in a building that had been turned over to him by the Imperial Chinese customs. This building, although 4½ miles from the railroad station at Tongku and difficult of access, was considered by him less liable to attack by the Chinese forces.

I was verbally ordered to take possession of the house mentioned, which was unfurnished, and furnish it for use as a hospital with materials from the adjacent houses, giving receipts for same when necessary. In the matter of expenses the hospital was to be considered as a part of the medical department of the *Monocacy*. This view was followed, and I hope will meet the approval of the Bureau.

After receiving the instructions I returned to the *Monocacy* and began immediately the collection of drugs, instruments, dressings, and other necessary equipment. Owing to the fact that the *Monocacy* has been in commission for many years, there were many things on hand in the way of dispensary furnishings that were very useful. There were four mattresses and four pairs of blankets available on the *Monocacy*. In a godown at Tongku that was being looted I found some cases containing spring beds and wicker chairs. These I took, together with a quantity of rice and other provisions. The *Newark* furnished me with 16 mattresses and 24 blankets on requisition, and lent me 50 hammock mattresses. Six fine leather-covered chairs were also furnished, but these I sent to the naval storehouse at Tongku as of too much value to be used under the circumstances, except in case of emergency. The *Newark* also sent surgical and medical supplies, prepared foods, and many other articles of great use. The *Yorktown* sent in brandy, ether, and a general assortment of useful articles. After the arrival of the *Brooklyn* the hospital was amply furnished with everything.

About 11 o'clock p. m. of the 21st, 3 wounded came down by rail from the action near Tientsin. I put them on board and treated them temporarily. At daylight on the 22d all hands turned to and loaded the hospital outfit onto launches and sampans, and with a squad of marines and sailors I went down to Taku; took the house as directed; commandeered the many things necessary to make it habitable, and by noon everything was shipshape, and we were ready for business. By 2 o'clock the three wounded marines were in the wards and one wounded Chinaman. If necessary 50 patients could have been taken in. In fact the only reasonable limit to our capacity was the kitchen. By great good fortune we found in the house adjoining a well-equipped kitchen with table fittings, and this we used until the hospital was closed.

The staff of the hospital, besides myself, consisted of one hospital apprentice from the *Monocacy;* a Japanese, named Yamata, a most excellent and reliable man; 1 hospital apprentice from the *Newark;* 2 marines from the *Monocacy* as a guard; 2 wardroom boys from the *Monocacy;* 2 coolies, and a cook (Chinese).

There was a good deal of labor required in running the hospital because of the distance from the *Monocacy* (our water base) and the great difficulty in procuring means of transportation for supplies and wounded. At times our water supply from the ship failed, but Captain Warrender, the English flag captain, kindly relieved us of great embarrassment by giving 1 barrel per day from their distilling plant at Taku. Fortunately for the comfort of everyone there was plenty of ice near at hand, and we were able to get a small supply of eggs, fresh meat, and a little milk.

After the arrival of the *Brooklyn* the hospital apprentice from the *Newark* was sent to his ship and one from the *Brooklyn* taken on.

The subsistence for the patients and attendants was secured by taking the ration for each man from the ship and then making up the deficiencies by purchases from the limited stocks of some Chinese compredores. A small purchase was also made from a firm in Nagasaki.

The hospital was opened on June 22 and closed on July 25. There were 417 sick days noted on the medical journal. These, with the 10 attendants (330 rations), make 747 rations supplied.

On June 24 the surgeon in charge of the English hospital fell ill with scarlet fever, and as they had no one to take his place immediately, I took charge for him. There were a number of cases needing operation, and I performed them at once with, I am glad to say, good results. After four days I was relieved by a staff surgeon from Wei Hei Wei, with a surgeon and two civilian assistants. During this time there were in the English hospital 2 cases of scarlatina, 1 of typhoid, and 24 wounded. Within a week Rear-Admiral Bruce with his entire staff paid a visit to our hospital to thank us for our work for them, and later he made an official report of the matter to Admiral Remey. The succeeding week Admiral Seymour and staff called and expressed appreciation for our aid.

As our hospital was the only one equipped with an operating table, it was frequently called into use by the English, Germans, and Russians. In all of such instances I gave all the assistance I could, both in aid and materials.

It is pleasing to note that these slight services were promptly recognized by the various commanding officers.

The Germans, who occupied the south forts, suffered severely from mine explosions, and a number of wounded were brought into our hospital for operation and subsequent treatment. One of these died on the table from shock after amputations of leg and thigh, the lower parts of each having been horribly mangled.

An analysis of the cases treated in the hospital may be of interest, so I shall detail a few.

Of the foreign patients on whom I operated I was able to keep track of but few. From such data as I have I can say the recovery from even severe wounds was the rule.

Of the patients admitted to our hospital 30 were suffering from gunshot wounds. Three of these were thought to be in extremis when admitted. One case died. Three will probably be invalided from the service, and one of these from a rapidly growing goiter.

I shall not attempt to classify the cases, but will give them in the order of their admission. Before doing so it will be necessary to a fair understanding of these wounds to know that about 90 per cent of the Chinese are armed with Männlicher rifles, caliber .303; the other 10 per cent mostly Mausers, caliber about .30, and Gingalls, having calibers about .55, .70, and 1.25. There are also in use a few Winchesters and Remingtons, caliber .45. The first two named are high-powered modern guns, using a jacketed bullet and having an initial velocity of about 2,700 feet. The Gingall is the so-called "two-man gun." It has a soft lead-bullet and low velocity. Of all the wounds that came within my view all but two were made by either one or the other of the first two named or were from shell fragments. The two exceptions were Gingall wounds.

Case 1, wounded June 21.—Small-caliber bullet entered left thigh at junction of middle and lower thirds just posterior to the median line, outer side. Exit on the same level, inner side, but a little to the front. Was carried 7 miles in the arms of soldiers, then brought down on freight car. Was taken on board ship for the night, and then brought down to the hospital 24 hours after receiving wound. Under chloroform enlarged the wound and removed loose bone, squared the ends of femur, and set in a tin splint, with extension by weights. Sent home on the *Solace* July 22. Wounds healed. Thigh in plaster. Good bone union. Walking on crutches. Leg shortened 2 inches. For two or three days after admission there seemed to be doubt as to the advisability of trying to save the leg because of extensive inflammation. This disappeared very rapidly after the wound had been cleaned.

Case 2, wounded June 22.—Long shell cut through right rectus femoris, 8 inches long. Healed by granulation. Sent to duty on August 1.

Case 3, wounded June 17.—Mangled shell wound of right arm and forearm, including elbow. Amputation near shoulder joint. Sent home July 22. This case is interesting in two particulars. He was a Chinese petty officer, wounded at 1 a. m. while joining a merchant ship at Tongku. The arm was dressed by his friends by packing the wound with fresh horse dung and then bandaging. The second point of interest was that after the operation he recovered from the ether very nicely, but soon apparent collapse set in, with involuntary evacuations of feces and urine. He was reported to me as dead, and at first glance I thought so. The heart was still beating a little, so I gave him 1 ounce of brandy hypodermically, with one-sixteenth grain of strychnia, wrapped him in blankets, and he soon came around. I have never heard of as large a dose of brandy having been given hypodermically.

Case 4, wounded June 20.—Mauser entered median line below apex of left scapula. Broke one rib just external to point of impact, passed upward and outward through left shoulder joint, carrying a 4-inch strip of leather canteen strap. Healed without incident, but the motion of the shoulder joint is so much restricted that patient was sent home on the *Solace* for probable survey.

Case 5, wounded June 18.—Small-caliber bullet wounded left forearm. Interesting because both bones had a distinct transverse groove without fracture. Large amount of callus thrown out. Healed without incident.

Case 6, wounded June 25.—Small-caliber bullet perforated left femur in the median line, 6 inches above the patella. No fracture. Sent to duty on July 10. I believe this to be a record case. A perforating gunshot wound of the femur entirely well in fifteen days.

Case 7, wounded June 21.—A small-caliber bullet entered 4 inches below the great trochanter, right thigh. Bone was badly fractured and comminuted. Exit in Scarpa's triangle. Bullet then cut through the scrotum, wounding the right testicle. Received practically no treatment until July 25. Was carried on junks under fire several miles, and the last 8 miles before reaching Tientsin was carried on a stretcher. Entrance wound was then enlarged, and a large abscess cavity opened, pus, pieces of brass (or more probably the bullet jacket), and loose bone removed. Was admitted to our hospital on July 5. I removed several pieces of bone and put the leg and thigh in plaster, with strong counter extension. On August 1 removed the splint because of the shrunken thigh and found that a large callus had formed and that the patient could move the leg himself. There was still slight discharge from the lower wound, but the others had all healed. Put on a modified Bavarian splint and transferred him to the hospital at Yokohama. Temperature normal during last week. One-half inch of shortening at present, but I think that when absorption of the callus takes place there will be at least 2 inches, because of the large amount of bone lost.

Case 8, wounded June 20.—Gingall-bullet wound, caliber 1.25. Bullet found in trousers of patient. Tore away about one-quarter of the muscular tissue of the left calf. Wound was very ragged. Was sewed up as much as possible, but the healing was mainly by granulation. There is extreme flexion of the foot, talipes equinus, due to the cicatricial contraction.

Case 9, wounded June 23.—Small-caliber bullet entered somewhat inside of the middle of right calf, plowed through the tibia downward and outward, passing in front of the fibula. Nearly transverse fracture of tibia at the site of wound. The anterior third of the shaft of the tibia above the transverse fracture was split off and pushed forward. The split extended 5 inches up the bone. Bullet was held in the skin and was not deformed. Wound was opened and the loose bone removed, and the large fragment was pushed back into place, as the periosteum was not much disturbed over it. A tin splint was put on posteriorly. External wounds healed in a week. Then put the leg in plaster. Is now in the Yokohama hospital, convalescent. This case goes far toward proving the contention that the modern high-power bullet does not go through the live man as it does through a cadaver. The range in this case was about 300 yards. In case 4 we know that the man was wounded by a Mauser in the hands of a German soldier, whose piece went off accidentally not more than 100 feet away. The bullet hung in the skin over the shoulder joint.

Case 10, wounded June 23.—Received in hospital July 6. Condition very low. Besides wound, had a very bad diarrhea. A fragment of 9-pound shell, measuring 2½ by ¼ by ½ inches, with rough edges and sharp corners, entered the abdomen 2½ inches above and 2 inches to the right of the pubic spine, passed downward behind the pubis, out through the obturator foramen, fracturing the ascending ramus of the ischium, thence into the thigh, comminuting the femur from the intertrochanteric line downward 8 inches. Intestines protruded. Abdominal wound healed soon after admission. As there was no external wound in the thigh, there was confusion in the history as to the cause of the fracture. This was cleared up when an opening was made in the inner side of the thigh and a large quantity of fetid pus, with pieces of clothing and bone, was evacuated. The patient's condition improved slightly, and at a consultation held with the German and English surgeons it was decided to amputate at the hip joint. It was recognized that the patient was in a desperate condition, but it was held that amputation gave him the only chance for life. This operation was done. Owing to the fractured femur there was considerable difficulty encountered in disarticulating the head of the femur. As there was already a wound in the inner aspect of the thigh and a large abscess cavity, a skin flap was made anteriorly and the femoral artery ligated before cutting into the joint. After disarticulating, a long posterior flap was made by transfixion. The operation was completed in twenty-two minutes. Patient recovered from the anæsthesia, but died in about an hour from exhaustion. The piece of shell was found in the wound. The femur was broken into two large fragments and many small ones. The lower and larger piece was turned around and forced into the body of the vastus externus muscle.

This man was buried in the yard of the hospital at Taku.

Case 11, wounded June 22.—This case is of more interest in a way than any of the others, because of its extreme rarity. A cupro-nickel jacket from a Männlicher bullet became detached and ruptured in flight, the base end flattened. It traveled with sufficient velocity to enter the thigh in Scarpa's triangle and pass through the muscles and come out just external to the left tuberosity of the ischium. The wound of entrance was 5½ inches long and of exit nearly 4 inches. It was held in the skin by a shred. The lead part of the bullet made a wound parallel and immediately beneath the large wound. Both wounds healed rapidly in spite of being infected and with a concurrent attack of diarrhea. This wound is the only one of its kind that I have been able to see or hear of, although in the earlier stages of the development of the modern jacketed bullet it was a frequent proving-ground incident.

Case 12, wounded July 13.—This case is almost an exact counterpart of case No. 1. The only variation was that immediate treatment was possible. The leg is now in plaster cast, and the patient is on the way home via the *Solace.*

The remainder of the cases treated in our hospital were mostly clean bullet wounds or small shell wounds, and all healed rapidly, and most of them were sent to duty.

On July 24 orders were received to close the hospital at Taku, as a base hospital had been established at Tientsin. Bills were therefore all paid, the several articles that had been taken from the adjoining houses returned, and the hospital stores and supplies sent to the *Monocacy.* The greater part of the stores were transferred at once to the hospital at Tientsin. Eleven patients were transferred to the *Solace* and one sent to duty.

I had a number of photographs of the hospital taken, but they were all of poor quality.

REPORT ON AID TO THE WOUNDED AFTER THE BATTLE AT PUERTO CABELLO, VENEZUELA.

By WILLIAM C. BRAISTED, *Passed Assistant Surgeon, United States Navy.*

On November 11 a battle was fought at Puerto Cabello, Venezuela, between the forces of Gen. Antonio Paredes, a former representative of President Andrade, of Venezuela, on one side, and the forces of Gen. Cipriano Castro, of the present de facto government, on the other. In this encounter the killed and wounded were variously estimated at between 200 and 300.

On the return of the ship to the harbor on the morning of November 12 the medical officer and assistants, by order of the commanding officer, landed at Puerto Cabello to render whatever aid they could to the wounded. The party was immediately conducted to the hospital. An operating room was improvised, and cases were operated on and dressed as fast as possible from 10 a. m. until 6 p. m.

The surgeon of H. M. S. *Pearl* accepted the invitation of the medical officer of the *Detroit* to combine forces and work together.

The following cases were presented:

Case 1.—An incised wound of the abdomen with escape of intestines. The patient had lain exposed to sun and flies for twelve hours, with 12 feet of intestines exposed. The intestines were black and sloughing; patient in collapse; and after careful consideration, upon a thorough examination, the case was considered hopeless and an operation not justifiable. The patient was made comfortable and died in a few hours.

Case 2.—Amputation of right leg at junction of lower and middle third for shell wound which had almost entirely separated the foot from leg. Flap operation performed, patient reacted nicely, and was doing well six hours after.

Case 3.—Removal of fragment of 3-inch shell from wound of left thigh. The fragment was large, weighing 6½ ounces, and deeply embedded. Wound was cleansed, drained, and stitched. Patient promised to do well.

Case 4.—Gunshot wound of foot, with comminution of all the tarsal bones. Wound opened, scraped, drained, dressed, and immobilized. Outlook for saving foot good with careful afterdressing.

Case 5.—Gunshot wound of left hip joint, with compound comminuted fracture of upper third of femur. Wound very extensive. Wound widely opened, scraped, cleansed, and drained, and fragments put in position; parts immobilized and long Hamilton side splint applied ready for extension of limb. Patient did well, and six hours afterwards seemed very comfortable.

Case 6.—Gunshot wound of right foot, with compound comminuted fracture of bones; dressed, drained, and splinted. Foot should do well and be saved.

Case 7.—Gunshot wound of right thigh, with compound comminuted fracture of lower end of femur and implicating kneejoint. Wound widely opened up, and kneejoint also, with partial resection of joint; scraped, cleansed, drained, and fragments put in position; immobilized with coaptation splints and long Hamilton side splint. Extension recommended.

Case 8.—Gunshot wound of left chest. Wound of entrance, angle of scapula; point of exit, between second and third ribs anteriorly; bullet then struck the lower left maxilla, fracturing the jaw, causing a compound comminuted fracture. The hæmorrhage was checked, wound of chest drained, and fracture of jaw dressed and immobilized with dental splint and Barton bandage. Case doing well.

Case 9.—Gunshot wound of left shoulder, with compound comminuted fracture of head of humerus. Wound opened, scraped, cleansed, drained, and bones and larger fragments put in place. Parts immobilized with shoulder cap and side splints. Case did well.

Case 10.—Gunshot wound of left arm, with compound comminuted fracture of left humerus, involving the elbow joint. Resected, scraped, drained, and immobilized with requisite splinting. Case did well.

Case 11.—Gunshot wound of left ankle joint, with compound comminuted fracture of long bones. Carefully opened, cleansed, drained, and immobilized. Case left in good condition.

Case 12.—Gunshot wound of left lower jaw, penetrating the vault of mouth and exit through right nostril. Cleansed, drained, fracture set with dental splint, and immobilized. Did well.

Case 13.—Gunshot wound of left foot, with compound comminuted fracture of tarsal bones. Scraped, dressed, drained, and immobilized with splint. With care foot will be saved.

Case 14.—Gunshot wound of right leg, middle third, with fracture of tibia. Bullet removed; counter opening and drainage; fracture set and leg splinted. Patient an aged woman; suffering from shock.

Case 15.—Gunshot wound of right side of face; entire buccal mass and parotid gland torn away. Sutured and dressed.

Case 16.—Gunshot wound of abdomen. Shot entered a little to the right of median line, ran entirely around abdominal wall to bones of spinal column; was then deflected backward and escaped at a point almost opposite to point of entrance. Case was dressed with antiseptic dressing and did well.

Case 17.—Gunshot wound of left hand, with compound comminuted fracture of carpal bones. Opened, drained, and splintered.

Case 18.—Gunshot wound of left leg, with compound comminuted fracture of tibia. Opened, bullet removed, and counter opening made. Drained, dressed, fractured ends of bones in good condition, and leg splitned.

Besides the above 18 cases, 7 cases were brought in from outside the hospital, mostly compound comminuted fractures of long bones, and of which there was no time to take notes. Many minor cases were dressed by the members of the ambulance party.

It is to be noted in regard to these wounds that the majority were compound comminuted fractures of long bones. The comminution was very marked.

The rifles used were mostly Mausers, but the ammunition was generally not the regulation Mauser bullet, but a softer leaden bullet that flattened out on impact and produced the most remarkable amount of disintegration of soft and hard tissues. The wounds of entrance corresponded to the size of the missile or were a little larger, while the wound of exit was very large and ragged.

It was found possible, with care and plenty of aid, to save almost all the injured parts, and with good chances of ultimate recovery of complete or partial function.

The hospital steward and members of the ambulance party were most earnest and assiduous in their work, and the thoughtfulness of the commanding officer in furnishing ample help is gratefully remembered.

Special credit is due Passed Assistant Paymaster George Brown, jr., who spent the whole day with us, assisted at the operations, and was untiring in his care of the sick. He succeeded in getting cots, food, and water for the patients, and exerted himself successfully to arouse interest in the inhabitants of the town, who promised him to look after the future welfare of the patients to the best of their ability. Reliable information received some time after the date of the operations indicated that all the cases did well except one.

REPORT ON THE BIRMINGHAM GENERAL HOSPITAL, AT BIRMINGHAM, ENGLAND.

By JAMES F. LEYS, *Passed Assistant Surgeon, United States Navy.*

On September 6, 1899, I had the pleasure of visiting this magnificent institution, which can, I believe, fully justify its claim to be considered the finest hospital in the world. The house governor of the hospital accompanied me in a visit to all parts of the institution on a day and at an hour when visitors are not usually admitted. He devoted two hours of his time to me and was tireless in answering inquiries and making explanations. I am indebted to him also for a copy of the architect's sketches and a brief historical account of the institution.[1]

During the visit I made many notes on matters not mentioned in the published descriptions mentioned above, but no enumeration of details will suffice to convey more than a faint impression of the perfection of this establishment in its building, equipment, and administration. It is an embodiment of all that our medical and surgical knowledge at the end of the century demands in hospital construction.

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[1] Placed in library of Museum of Hygiene, Washington, D. C.

The present building, the corner stone of which was laid in September, 1894, was opened in July, 1897. It contains 346 beds. The ground on which it stands cost £50,000, the building £150,000, and the furnishing £13,000; total, £213,000, or $1,037,300, a cost of $3,000 per bed. It was all paid for by the liberality of the citizens and opened free of debt. It is supported at an expense of about $115,000 a year, one-fourth of which is derived from endowment, one-third from regular subscriptions, one-twentieth from the Birmingham Musical Festival, and the remainder, about one-third, from church collections and irregular subscriptions.

The lot occupied by the building is of 3¾ acres, of which the structure covers about 2 acres. The ground plan and sketches[1] will give an adequate idea of the general arrangement of parts.

The quarters for physicians, for nurses, and for other employees are well separated from each other and from the wards, giving to those off duty that actual rest, quiet, and freedom from annoyance to which they are entitled and by which their comfort off duty and their efficiency on duty are greatly enhanced. It may be proper to say in passing that the English seem to be far ahead of us in appreciating the wisdom of this. In the great army hospital at Netley, perhaps the largest military hospital anywhere, no medical officer has his living quarters in the building. The officer of the day sleeps in the building at night; others go to their quarters in a separate building when not engaged in the professional labors of the day. The same is true in the great British naval hospitals at Plymouth and elsewhere.

This separation of living quarters is most complete at Birmingham in the case of the nurses. Their building is entirely separated from the hospital proper on the one hand by a stretch of turf and on the other by a tennis court. It contains 106 separate bedrooms and is approached centrally from the hospital through a spacious conservatory, which forms a sort of veranda in summer and a sun parlor in winter. Ninety-five nurses, certificated or in training, are employed. This is the number of professional nurses, and does not include ward women and ward men, of whom there is a sufficient number to perform efficiently all the labor required of such persons. The training school gives probationers a three years' course. The pupil pays to the hospital a premium of £21 and receives no pay for the first year; for the second year she gets £16; for the third, £18. She is then certificated and receives £24 a year if she remains longer, increasing £2 a year to £30, the maximum pay.

The hospital contains ten wards of the same size in five two-story wings, each ward containing 24 beds. Besides these there are accessory and isolation wards, containing 106 beds more. Each ward is approached through a vestibule, on each side of which are anterooms, used as linen closets, ward pharmacies, etc. The ward holds 24 patients, with 1,850 cubic feet of air per patient, changed 8½ times an hour. Under the floor is a cement, to which the hard-wood flooring is nailed while it is soft. The floor is finished with hard varnish. It is perfectly noiseless. The walls and ceilings are covered with a patented impervious substance called adamant. In the ceiling this is laid on steel lath. The whole building is absolutely fireproof. The ceiling meets the walls and the walls meet the floor in easy curves instead of square corners, affording no place for the collection of dust. The windows, reaching nearly to the ceiling, are very high—a window between every two beds. The windows are all sealed tight, the steel sash being set immovably in the wall. No accidental ventilation can occur. The air, brought by a plenum trunk, enters between the outer sash and an inner half sash reaching halfway up the window. There are five such intakes in each ward. No draft is perceptible near any bed. All beds stand well clear of the wall, and behind the heads of five of them, in the wall down at the floor, are the five outtakes of exactly the same sectional area as the five intakes. The bedsteads, of iron pipe, are especially constructed, round at all joints, with rubber casters at the head and rubber plugs at the feet, making them easily moved when desired but firmly fixed otherwise. Each carries a wire mattress and a 5-inch all-hair mattress. In every alternate space between the beds there is an electric connection for a portable ophthalmoscopic lamp.

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[1] In library of Museum of Hygiene, Washington, D. C.

At the farther end of the ward there are on one side the wash room, on the other side the closets. Both of these are paved, as is every part of the building except the wards, with terrazza, an Italian mosaic stuff of marble and hard cement, worked to a high polish. Everywhere walls and floors and ceilings make no corners. Every piece of furniture here, like the bedsteads, was made to order from a special design for this hospital, the doorknobs, bolts, basins, bath tubs, faucets, drains, plugs, soap dishes, everything. Bath tubs and basins stand away from the wall; soap dishes stand away from the edges of basins. Every bit of plumbing is simple and easily accessible. A hose could be turned into the room and every surface of every object washed by the stream. The same thing could be done in the wards if the mattresses were removed, or, for the matter of that, in any other part of the building. An automatic arrangement in the water-closet room having, like everything else, no crease or seam in it, receives a bedpan and washes it. The nurse is not obliged to stoop even in hanging the bedpan on. In these rooms, bathroom and closet room, the area of the outtakes for air exceeds the area of the intakes.

In the operating rooms, of which there are three, one large and two small, the air intakes exceed the outtakes in sectional area. The entire ventilating system being on the plenum principle, with no exhaust, the effect of this proportioning of intake and outtake area will be seen. When an operating-room door is open the draft is always *from* the operating room to the corridor. When a water-closet or bath-room door is opened the draft is invariably *toward* that room and *away from* the ward.

The scientific perfection and professional luxury of the operating rooms are almost beyond description. There is perfection in everything. Floored, lined, and ceiled with specially treated marble, alabaster, and cement, they are furnished with everything that the heart of the aseptic surgeon can desire.

Soiled linen is not carried about the building, but, across the corridor from every ward and operating room a wide chute opens in the wainscoting, descends perpendicularly in the wall, and is opened below, outside the building, where the soiled linen is gathered and removed to the laundry. These chutes are wide and straight, lined with polished stone and kept perfectly clean. They are closed at both ends when not being used, and never opened at both ends at once.

There are four ventilating stations in the basement, each with duplicate plants, one of which runs at a time. There are thus eight units in the system, four of which are always running. The system takes in, filters, washes, humidifies, and warms 20,000,000 cubic feet of air per hour, changing all the air in the building from 8½ to 10 times an hour without producing a draft anywhere. The total length of the main conduits or tunnels, large enough for three men to walk abreast and erect through them, is over 2 miles. The outtake conduits are under the ridge of the roof. By the system of heating the air for different parts of the building in every corridor and ward and room in the place can be kept at its own appropriate temperature constantly, summer and winter. In the wards hang thermometers with charts, on which, at stated intervals during the day, the observed temperature is recorded. The temperature of a given ward will not vary over a range of more than 2° F. through the winter.

The inmates of the hospital, thus sealed up in their own atmosphere, are subjected to no vicissitudes of heat and cold, fog, smoke, dust, high or low humidity, but have their air scientifically strained, warmed, moistened, and brought to them in abundance and with perfect regularity.

REPORT ON AN EPIDEMIC OF ACUTE ANTERIOR POLIOMYELITIS OF ADULTS ON THE ISLAND OF GUAM, LADRONE ISLANDS.

By ALFRED G. GRUNWELL, *Assistant Surgeon, United States Navy.*

The disease was evidently brought to the island by the Spanish transport *El Cano*, carrying troops and emigrants from Manila to Saipan, another island of the Ladrone group, for prior to the arrival of the transport in Guam the disease, according to the priests and best informed citizens, had never been known on the island. The epidemic started in Sumay, the village nearest the harbor, within a week after the arrival of the *El Cano*, and upon her arrival in Saipan the disease is said to have made its appearance there. The vessel was in a very insanitary condition, and during her stay here, there being no health officer on the island, free communication between the ship and the shore was allowed, and several of the emigrants left the ship and took up their abode in Guam. It was impossible to ascertain if there were any deaths from the disease in question on board the transport. From Sumay the epidemic soon made its way to Agaña, the capital and largest town, and from there it spread over the entire island. There were about 70 deaths and a large number of recoveries, but those who recovered were left more or less paralyzed.

The following quotation is from a written statement of one of the best informed natives, who had splendid opportunities for observing the conditions: "When anyone is sick of that disease and does not die within three or four days, he is sure to have some members of his body paralyzed, and it always happens either in his arms or legs."

Young adults of both sexes were the most frequent victims; the extremes of age in the cases which have come under observation being 15 and 50. Persons in apparently perfect health were frequently stricken.

Before the arrival of the U. S. S. *Yosemite*, the epidemic had died out,[1] leaving nothing but the resulting paralyses and the statements of those who passed through it from which to draw conclusions. The accounts of the acute stage are therefore either from persons who suffered with the disease or from those who had good opportunities for observing it.

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[1] The epidemic began on May 9, 1899, and lasted until August 1, 1899.

The onset of the disease was always very sudden, occasionally after a day or two of prodromes, with fever, and often with a chill; the fever lasting from three days to a week. The sensory symptoms were variable. In a few cases there was considerable pain, but in the vast majority, except some pain in the joints, there was no suffering.

In a considerable proportion of the cases there was temporary anæsthesia, but in every case it soon vanished. In some instances the aching about the joints persisted for a long time. The tactile sense and the heat sense in all observed cases were perfectly normal. There is no history of œdema in any case. In all the patients seen there was no weakness of the sphincters, and from all accounts of the acute stage of the epidemic the sphincters were unimpaired, except in two or three instances, when there was a very transient incontinence of urine, which was troublesome. No case of impairment of the functions of any of the cranial nerves has been seen, and no psychical symptoms have been observed. It is stated, however, that in a few instances, in cases which died, loss of the power of speech was a symptom. There were no skin eruptions noted. In some instances a rigidity of the body, which developed with the fever, is described. This was probably orthotonos or opisthotonos, and was most likely due to an accompanying meningitis, though this symptom was, from all accounts, by no means present in all cases. Headache as a symptom was variable, and was not emphasized by those who passed through the sickness. In some cases it was not present. The motor symptoms are the most interesting. In a certain proportion of the patients muscular twitchings were noted at the onset, and in some instances they persist, though they are at present very slight. Spasms of muscles or groups of muscles were entirely absent in many cases, and in those in which they were present they were probably identical with the above-mentioned rigidity. Paralysis, accompanied by flabby atrophy of the affected muscles, is now all that remains of the epidemic, and, so far as can be observed, the statement of the native above mentioned, that every one who contracted the illness and escaped death was left with some member of his body paralyzed, is borne out by facts. The paralysis is described as having come on suddenly, in some cases a week elapsing before it was fully developed. It was invariably accompanied by atrophy of the affected muscles, but there was a tendency toward later improvement. In some cases that have been under observation for three months the improvement has been marked. The paralysis is of muscular groups rather than of whole limbs, and in some cases the affected groups are so numerous and so widely distributed as to practically render the patient helpless. Ordinarily, however, the extensors of one arm or one leg or of an arm and a leg are affected. In the arm the deltoid group, including the biceps and the brachialis anticus, is the one most commonly involved, though loss of power of the extensors of the forearm is often seen.

In the leg the quadriceps extensor is almost invariably paralyzed, and the tibialis anticus sometimes. Almost every patient examined has been able to flex the leg to a greater or less degree. The accompanying atrophy, which is invariably present, is often extreme. In one case, in which the deltoid was almost totally wasted away, the head of humerus was 2½ inches below its normal position, and the bony prominences of the affected shoulder joint could be seen with perfect distinctness. In this particular case there has been very marked improvement. Unfortunately, there has been no opportunity for testing the electrical reactions of the affected muscles. The deep reflexes are invariably abolished in the affected limbs. There is a strong tendency toward improvement in the paralyzed limbs, but whether recovery will be complete in any one case it is as yet too soon to say. Again, just how much of the improvement is due to recovery of the paralyzed muscles, and how much is due to sound muscles gradually adapting themselves to some of the work of their unfortunate neighbors, is at present difficult to determine. Certainly some of the atrophied muscles appear to be more plump than formerly.

The following is an account of three cases selected at random in the village of Sumay:

No. 1.—M. P., girl, aet. 19, Chamoro, native of Sumay. Was attacked by the disease two months previously. Onset sudden, with chill and fever, which lasted about a week. With the fever there was some pain in the joints; there is no pain at present. Paralysis was preceded by muscular twitching, came on suddenly, and has not progressed any since. It is confined to the lower extremities (quadriceps extensors, more pronounced right side), accompanied by atrophy. Cranial nerves uninvolved; no history of delirium or psychical disturbances. Sphincters normal; reflexes lost. No history of spasm or rigidity. No secondary deformity beyond atrophy of involved muscles. No history of œdema. Very slight headache at time of onset.

No. 2.—L. S., man, aet. 23, Chamoro, native of Sumay. Disease came on three months previously with fever and chill. Patient was in perfect health before attack; paralysis developed within a day. No history of spasm or rigidity preceding paralysis. Disease developed with pain throughout entire body, and was followed by anæsthesia more or less complete; very slight pain at present in shoulders. Sphincters normal at present; troublesome incontinence of urine during first week of disease. Paralysis both arms and both legs, rendering patient helpless; atrophy variable; legs very flabby. Deltoid, biceps, and extensors forearm paralyzed. Reflexes lost. Muscular twitching still present in slight degree. Headache variable. No œdema.

No. 3.—A. D., man, 48, Chamoro, twenty years' residence in Sumay. Attacked three months previously. No chills; slight fever; paralysis very sudden, preceded for a short time by muscular tremors. Extensors left leg involved; atrophy moderate, but marked; reflexes both legs lost; sphincters normal. No history of muscular spasm, rigidity, nor œdema. Cranial nerves uninvolved, and no history of delirium nor of psychical disturbances.

Occuring, as it did, at a time when epidemic cerebro-spinal meningitis was raging in so many different parts of the world, it might be well in conclusion to emphasize some of the reasons for regarding this epidemic as one of anterior-poliomyelitis rather than one of cerebro-spinal meningitis. The features regarded as distinctive are as follows:

The constancy and character of the paralyses and atrophy in those who took the disease and escaped death; the total absence of paralysis of any of the cranial nerves; the total absence of psychical symptoms; the absence of petechial or other skin eruptions; the infrequency of orthotonos and opisthotonos; the comparative freedom from pain and the characteristic headache of meningitis; the complete abolition of the reflexes. Undoubtedly meningitis was present in some cases, but in these instances it should probably rather be considered as a complication than the primary affection.

The treatment, which has been extremely simple, has been directed solely to attempts to improve the condition of the paralyzed members, and necessarily so, since the disease in its acute stage had disappeared before the arrival of the expedition. Diet, massage, and prescribed exercise were found very useful. Large doses of the iodide of potassium were given in all cases, with strychnine and arsenic as adjuncts in some. There has been noticeable improvement in all the cases receiving treatment; in some of them the degree of improvement is gratifying.

REPORT ON SANITARY WORK, NAVAL STATION, HAVANA, CUBA.

By RAPHAEL O. MARCOUR, *Assistant Surgeon, United States Navy.*

Most of the naval property here is situated in the worst section of Havana. The part known as the Machina is situated on the west side of the harbor, a distance of about 2 kilometers from the entrance. Its northwesterly end is next to the custom-house wharf, or landing of emigrants; the southeasterly end is next to the Herrera wharf. There is a very large city sewer which empties under the custom-house wharf. This sewer is a source of much discomfort to the occupants of the Machina and of the Admiralty Building in its rear on account of the foul, stagnant odors emanating therefrom.

The Machina inclosure is 450 feet long and 100 feet wide, and contains two buildings, both having only ground floors. The main building is the Marine Barracks, which is 118 feet long by 35 feet wide, and has 14 rooms. This building was occupied by the marines during their stay here, and is now used as a storeroom for their effects. The two rooms at the extreme north end are used as a dispensary and sick bay. This building is 60 feet from the water's edge, and very often when the tide is high the wash comes within 10 feet, depositing débris of the bay on the Machina ground.

The second building is at the southern end of the Machina, measures 76 feet long by 40 feet wide, and has nine rooms. This building is 88 feet from the water's edge; it is fairly well ventilated, and is used as a hospital. It is referred to in reports as "the detached building of the Machina."

There is also a slip in the Machina inclosure for landing boats.

The following is a brief résumé of the sanitary work done at this station previous to and after my arrival.

The first thing done was to put the Admiralty Building in good sanitary condition. The work began on January 1, 1899. The Admiralty Building is in the rear of the Machina, on the west of the harbor. Considerable rough cleaning was done, 18 cart loads of dirt and scraps having been removed. The water-closet drain from the corner room of the top floor, originally made of porous terra cotta, led vertically through the wall to the ground floor and emptied into a sewer. This, as well as the drain from the corner room of the lower floor—originally, also, of terra cotta—has been replaced by iron pipe. The following additional work was done: New water-closets and bath tubs put in; bell traps placed in stable; stall drains remade and led into one trap discharge; opening into the sewer in the court on the ground floor for carrying rain water trapped; all sinks on ground floor trapped; a new water-closet on balcony of front room, top floor, put in; the floors of two rooms on the office floor scraped and shellacked; rooms fumigated with sulphur or formaldehyde, seventy-two hours for the former and twenty-four hours for the latter; all paint work washed with a bichloride solution 1–500, and rewashed with soap and water; all whitewashed surfaces rewhitewashed; most of the rooms where sulphur was used were repainted; all floors were thoroughly wet with a bichloride solution 1–500 prior to fumigation with sulphur and after fumigation with formaldehyde; the woodwork and floors of stable were covered with a solution of chloride of lime.

The ground floor of the north wing of the Admiralty Building, previously occupied by the post-office authorities, was vacated about the latter part of April, 1899, and was overhauled and disinfected. The flooring was made of large flagging, which was taken up and the ground picked, disinfected, and repaved with cement; the walls of the ground floor were picked wherever necessary, replastered, fumigated, and whitewashed.

There is needed a trap drain pipe in a corner room on the ground floor of the Admiralty Building.

All drains on the ground floor should be replaced by iron piping, which should be extended with vitrified earthen drains through the Machina, in place of the old connection now existing.

A fresh-air pipe in the water-closet of corner room, top floor, carrying the pipe above the roof, should be supplied.

Machina.—All the floorings were removed, the ground remade, abolishing rat tunnels, and concrete and cement floors made, except in the storeroom, where flat, square stones were laid in cement. The paving of courts was relaid, the same flagging being cleaned and reused. Three cesspools were emptied and then filled with lime, rubble, and dried earth. The cesspool in the court in rear of the north rooms of the Machina Building communicated by rat tunnels with the five adjoining rooms, the flooring of one room being broken through by rats. A drain starting in a small court and running under the building to the water was exposed its entire length and put in good condition, lined with cement, and covered with stone laid in cement, that part under the flooring of the room and several feet behind the building being covered with cement. This drain was stopped by deposits and was cleaned its entire length. The rain and waste-water drain, starting in south court and discharging in the bay, was exposed its entire length; the parts of the drain under the court and the two rooms near by were cleaned and repaired, lined with cement, and properly covered. The part extending from the front of the house to the harbor, being in very bad condition, was replaced with iron piping. Near the sea wall an independent connection was made by iron piping leading to the new water-closet and bath tub placed in the outhouse at the end of the court back of marine officers' quarters. The old water-closet in the middle court was replaced by a new one (this water-closet was never used). The sink in the kitchen was trapped with an S trap and the wood supports of the sink renewed. The water-closet which connected with the cesspool in the south court was removed, a new sink, properly trapped, being placed in that small court back of the first three rooms. A wooden cover in the court was pulled down and renewed. The ground of the outhouse, next to the marine officers' quarters, was remade and paved with tilings and its front pulled down and made of corrugated iron. A new water-closet in the large or north court was put in place of an old one. All the rooms were fumigated with sulphur; the woodwork was washed with a solution of bichloride of mercury, 1–500, and the walls and ceilings rewhitewashed. The lower part of the walls of all the rooms had been picked and cemented before fumigation. The shed in the north court in the rear of the corner room was rebuilt, all work being done before fumigation. The walls of the court were picked, where necessary, scraped, replastered, and whitewashed. The roof of the building was repaired, and part of the rain-water drainage led into the street instead of through pipes within the walls into a drain.

The parts of the sewer within the Machina inclosure, extending from the two water-closets near the gate and discharging into the harbor, were exposed and the stone covering made tight. This sewer is the main sewer from the Admiralty Building, and the rats from the custom-house walls and drains had established a number of connections. The Machina Building is naturally damp, and as little water as possible should be used in keeping the building clean. There should be a rack extending from the officers' water-closet to the Machina proper, in order that the mattresses belonging to the men can be aired daily, between the hours of 10 a. m. and 2 p. m. The bedding should also be aired. Three garbage cans for the reception of garbage from the kitchens of the Admiralty Building and Machina have been placed at the farther end of the Machina, and are emptied into a garbage wagon daily. A man was employed to scrape and keep the sea wall clean. A grated gate has been placed at the entrance of the slip, on a level with the sea wall, in order to prevent the ingress of refuse matter.

The detached building at the Machina.—The flooring of six rooms and that of the hall was removed, the ground remade, and concrete and cement floors put in. The wooden floors of the two south rooms were removed and good concrete and cement floors were found beneath them. The flooring of the end room to the north was of stone laid in cement in good condition and was not removed. The shelves and casing were torn out of that room. All the wood casing of the six rooms in the center of the building to the right and left of the hall was torn out, and the walls were picked for half their height and cemented. The ground in the court in the rear of the building was remade and paved with flagging.

A cesspool in the corner of the court back of the building was cleaned and, the bottom having been broken, filled with lime, rubble, and dried earth. A water-closet was also torn out. The drain from the sink was reestablished, connection being made with the underground drain, extending along the south side of the building to the harbor. The latter drain was exposed for its entire length, cleaned, repaired, and covered with flat stones laid in cement. A new water-closet was placed just outside the court and to the north. Iron piping was laid and connection established with the water-closet drain in the outhouse of the main Machina Building. The walls of the hall were picked for several feet above the floor and cemented. The woodwork was torn out of all rooms and all walls picked where necessary. Bell traps were placed in the court, near the sink, the floorings of kitchen repaved, a leaking drain within the wall from the roof repaired, and the roof inspected and several leaks found and stopped. All rooms were fumigated with sulphur, remaining closed for seventy-two hours, after which time the doors were thrown open and woodwork washed down with a bichloride of mercury solution, 1–500, then rewashed with soap and water.

Considerable work of a sanitary nature was also done on the building used by the captain of the port and as the headquarters of the pilots, before my arrival. That property is in another part of the city and is no longer under the control of the Navy Department.

Navy-yard.—There was a general cleaning of the grounds. About 25 cesspools were found, cleaned, limed, and filled. Two of the cesspools were in the court back of the marine officers' quarters, three water-closets connecting with them—two on the ground floor and one on the upper. These closets were retained and connection made by 5-inch iron piping, running the entire length of the marine barracks, with the water-closets of the barracks, where an 8-inch iron pipe was put in and carried over a hundred feet to one of the main sewers of the yard. Near the water-closet of the marine barracks a large cesspool was cleaned, broken, and filled. The old water-closets of the barracks were torn out and new ones, properly trapped, were put in. The ground of the water-closet building was remade and repaved and the roof of the marine barracks repaired. This building was thoroughly disinfected with sulphur, kept closed for seventy-two hours, then opened, all woodwork washed down with a bichloride of mercury solution, 1–500, and rewhitewashed.

House of the captain of the yard.—This building was put in a thorough sanitary condition and complete sewerage connections made, iron piping being laid to the main sewer, running along the east side of the yard. Two cesspools were abolished, the walls of the building picked where necessary, and the flooring and roof repaired. This building was disinfected with sulphur and washed down with solution of bichloride of mercury. Since a patient suffering with yellow fever was removed from this building I have had it again disinfected, first by washing all the flooring, walls, ceiling, woodwork, and furniture with a solution of bichloride of mercury, 1–500, then fumigated with formaldehyde gas, after which the house was repainted.

The commandant's house.—The entire sewer, extending from the bath within this building to the harbor, has been cleaned and in the rear of this building and the house of the captain of the yard has been covered with cedar posts, boiler iron, and cement. This building was thoroughly disinfected, sulphur being the fumigating agent.

Sailors' quarters and temporary hospital.—This large building was partially overhauled. Two large cesspools were abolished, the sewers were overhauled and cleaned, the roof repaired, and the building disinfected with sulphur and rewhitewashed. Considerable plumbing has yet to be done in this building. The water-closets were partially repaired. The large sewer in the court of this building has been cleaned and washed with a solution of chloride of lime.

The doctor's house at the entrance to the yard was disinfected with sulphur and formaldehyde. Disinfection of all the dwellings in the yard has not yet been completed. Considerable grass and rubbish have been burned, and the streets cleaned.

The city authorities cleaned the large city sewer, which runs through the western part of the yard, and placed a wooden casing inside. This sewer was originally about 12 feet square, and the wooden casing placed therein was about 3 feet square. This sewer received the main sewage and drainage of the yard.

The city authorities are now removing all the garbage from the navy-yard and Machina.

The following hygienic measures were adopted to check or prevent the spread of infectious diseases:

Whenever anyone complained of being sick, he was carefully examined, and if his case looked suspicious, he was carried in a litter to the hospital. He was then disrobed, the garments being cut off if necessary, the object being to avoid disturbing or moving the patient. The hospital apprentice was then detailed to remain with him constantly, written directions being given. The patient was then given a cleansing bath, and his old garments placed in a solution of bichloride of mercury (1–500). The room from which the patient was taken was then prepared for disinfection. Should others sleep in the same room occupied by the patient, their effects, as well as those of the patient, were disinfected. All the clothing of the inmates of the room, or rooms (if they are communicating rooms), is tied up in bundles and sent to the disinfecting barge *Protector*, where the clothes were passed through a steam chamber, having a temperature of 240° F., remaining for forty-five minutes. The boat in which the clothes were sent to the disinfecting plant was next disinfected by being washed with a solution of bichloride of mercury (1–500). The clothes were then brought back and placed in a room, previously prepared. All of the movable articles of the infected or supposedly infected room, or rooms, were then washed with a solution of bichloride of mercury (1–500), and sometimes stronger, special care being taken in the preparation of the solution. All ditty-boxes were then opened and a strong solution of formalin sprinkled therein, the outside of the box being washed with a solution of bichloride of mercury. The boxes were then left open in the room, so as to be exposed to the formaldehyde gas. The rooms were then measured in order to get the cubic space, then closed and sealed, and twice the customary amount of formalin solution of double strength forced in.

No one, with the exception of the nurses, was permitted to come near the hospital while there was a case of fever in the building.

If the patient died, an autopsy was held as soon as practicable and the body removed to the cemetery. None of the men from the station were allowed to handle the coffin.

The effects of the deceased were disposed of by burning.

All infected articles were disposed of in the same way.

REPORT ON CASES OF YELLOW FEVER AT THE NAVAL STATION, HAVANA, CUBA.

By Raphael O. Marcour, *Assistant Surgeon, United States Navy.*

On January 1, 1899, the naval station at Havana was turned over to the United States authorities, and measures were instituted to render the quarters intended to be occupied on that station as free as possible from infection. These measures comprised not only disinfection, but primarily extensive gross cleaning of the buildings, drains, and sewers, and repairs. It was recognized that the sections of the city comprising the navy-yard and Machina, and their immediate surroundings, were likely to be infected, and any occupation of the naval properties beyond that necessary to maintain a small guard was deemed inadvisable. Only that portion known as the Machina was so occupied. The navy-yard here is situated in the most undesirable section of Havana from a sanitary point of view. The part known as the Machina is situated on the west side of the harbor, a distance of about 2 kilometers from the entrance. Its situation on the water front is very objectionable. Its northwesterly end is next to the custom-house wharf or landing of immigrants; the southeasterly end is next to the Herrera wharf. There is a very large city sewer which empties under the custom-house wharf. This sewer is a source of much discomfort to the occupants of the Machina and of the admiralty building in its rear, on account of the foul, stagnant odors emanating therefrom.

The Machina inclosure is 450 feet long and 100 feet wide, and contains two buildings, both having only ground floors. The main building is the marine barracks, which is 118 feet long by 35 feet wide, and has 14 rooms. This building was occupied by the marines during their stay here, and is now used as a storeroom for their effects. The two rooms at the extreme north end are used as a dispensary and sick bay. This building is 60 feet from the water's edge, and very often, when the tide is high, the wash comes within 10 feet, depositing débris of the bay on the Machina ground. The second building is at the southern end of the Machina, and measures 76 feet long by 40 feet wide, and has nine rooms. This building is 88 feet from the water's edge; it is fairly well ventilated and is used as sick quarters. It is referred to in reports as "the detached building of the Machina." There is also a slip in the Machina inclosure for repairing boats.

On April 27 the marines came ashore and were quartered in the barracks at the Machina. This building had been thoroughly overhauled, cleaned, and disinfected. The first case of yellow fever did not appear until forty-six days after the barracks were occupied. In all there were 14 cases of fever on the station, in most of which the suspicion of yellow fever was entertained. Six of these 14 were diagnosed as yellow fever by all the physicians who saw them; 3 of the remaining 8 were diagnosed as yellow fever by myself, none of the other physicians agreeing with the diagnosis. The remaining cases were finally considered to be of a malarial nature. Among the 14 cases of fever was an American employee. He was treated at the sick quarters and all agreed that his case was one of yellow fever. There seemed to be no connection between the cases of yellow fever. Of the 9 cases diagnosed as yellow fever, 2 were private marines, 6 were among the other enlisted force of the station, and one a laborer above mentioned employed at the navy-yard. With the exception of the last case, all had been on duty at the Machina or in the admiralty building or in the immediate vicinity of the Machina, but many had been more or less in communication with the navy-yard.

During the time of the outbreak of the yellow fever the average complement of the station was about sixty, not including a number of special laborers and watchmen not in the enlisted force of the Navy.

The history of the first case was as follows:

W. K., a private marine, age 24, had been forty-six days at the station when taken ill on June 11. He had been on duty as sentry at the Admiralty building, at the brig, and at the main gate of the Machina during the time immediately preceding his illness. His name appeared on the liberty list on June 2, 3, 6, and 9, returning on time before sundown clean and sober. It is significant, however, that during these four days he is reported to have visited a certain house of ill repute on Picota street, which is said to be in a very insanitary condition and to have been the place where a death from yellow fever had occurred some time before.

The deceased had not been feeling well throughout Sunday, the 11th of June; having turned out with headache, stomach ache, and having vomited twice during the day with no relief, he applied to the hospital steward for a dose of salts in the evening about 6.30 p. m., stating that he was constipated. On the next day he went to drill at 6.15 a. m. feeling very sick. The first sergeant noticed his blanched appearance and that he was perspiring profusely and ordered him to fall out and report to the medical officer. He reported at sick call at 9.15 a. m. His facies was striking. He was pale, trembling, perspiring freely; eyes slightly injected and conjunctiva tinged with yellow; tongue wide, coated, and indented; gums pink and hard. His temperature was 98.8° F., pulse 72, and respiration 19.

The only thing he complained of was headache, stomach ache, and a bad taste in the mouth. The liver and spleen seemed to be of normal size. He was immediately removed to a room in the sick quarters, his baggage and bedding being placed in a separate room in the same building. Other patients in the sick quarters were removed to the room used as a brig. At 12 noon his temperature was 103.6° F., pulse 73, respiration 20. During the afternoon the patient was restless, his face congested, and urine gathered at 6 p. m. contained 12 per cent moist albumen. The urine of the entire command having been examined some time previously and K.'s having been normal, there was no question but that this albumen was dependent upon the patient's present illness. At 10 p. m. his temperature was 101.5° F., pulse 82, respiration 22. The next day, June 13, the symptoms were more characteristic, the eyes sunken and the face congested, especially over the malar region. The skin over the upper part of the sternum and neck was also congested, and standing at a distance of 8 or 10 feet distinct icterus could be detected. The face had a dusty or sandy look and the patient had the expression of a man who was suffering considerably. Cephalalgia was severe and pain in the stomach increasing. The temperature was 100° F. at 6 a. m., pulse 60, respiration 20. Twenty ounces of urine were passed containing 10 per cent moist albumen. The patient vomited at intervals and in the evening this symptom assumed a projectile type with the characteristic coffee-ground precipitate. The patient grew steadily worse and had black vomit later in the evening. At 4 p. m. his temperature was 98.4° F., pulse 80, respiration 22. He urinated 20 ounces, but no albumen could be detected. On the 14th the black vomit continued with increasing frequency. At 6 a. m. the temperature was 97.4° F., pulse 90, respiration 23; urine, 22 ounces—no albumen found. Icterus was now marked, delirium supervened with collapse, and death on the 15th at 8.24 a. m.

Treatment.—The treatment was entirely symptomatic. The first thing indicated was to place him in bed immediately and to order rest. On the first day quinine sulphate, grains 10, was given and half a cup of beef tea in the morning. In the afternoon quinine sulphate, grains 10, was again given, with very little or no effect in reducing his temperature. He was then sponged under a blanket with cool water and his temperature fell two degrees. An ice cap was placed over his forehead and temporarily relieved that symptom. Cracked ice and champagne in small but repeated doses were given for the gastric symptoms. He was given iced vichy (Celestin's) in small doses ad libitum. Hypodermic injections of strychnia were given when indicated. The lower bowel was frequently washed out with warm water and soapsuds and the patient always experienced great relief from it and always rested a little after an enema. For the vomiting cracked ice and champagne and iced drinks were given and counter irritation applied to the epigastrium. When collapse supervened strychnia was given hypodermically.

The necropsy held one hour and forty-six minutes after death revealed the pathological appearances of a case of yellow fever.

The case presented a number of points of special clinical interest.

First. The disease was ushered in without a chill.

Second. The patient only complained of three things throughout his illness, namely, headache, stomach ache, and a bad taste in the mouth.

Third. The pulse and temperature did not follow Faget's law, but there was a lack of correlation between the two.

Fourth. Altogether he vomited but eighteen times, fourteen being black and of the projectile type.

Fifth. Black vomit made its appearance thirty-three hours after he was first seen, and fifty-four hours after the time he first vomited in his quarters, and continued nine hours.

Sixth. A specimen of blood was taken from the lobe of his left ear on the night of the 14th and the agglutinative test applied with negative results.

Seventh. The quantity of urine passed daily averaged 51 ounces, and its specific gravity remained at about 1.030 throughout the course of the disease.

Eighth. Albumen appeared in the urine nine hours after the patient was seen and in thirty-three hours after the onset. It was present in diminishing quantity for twelve hours.

Isolation and disinfection.—On the morning of June 12 the effects of the deceased were removed from the quarters in the barracks immediately on the discovery of suspicious symptoms and placed in a room in a detached building. It was decided to disinfect these quarters, together with the effects of eleven other occupants of the room the next morning, and men from the disinfecting plant (*Protector*) were kindly sent for this purpose, supplying disinfecting apparatus, labor, and material.

The room in the quarters occupied by the marines has a capacity of about 16,000 cubic feet. The effects of the eleven men were sent directly to the disinfecting plant and passed through a steam chamber, at a temperature of 240° F., remaining in the chamber forty-five minutes. The articles of rubber or leather were dipped in a solution of bichloride of mercury, 1–500, and allowed to dry in the sun. Chests and ditty boxes were sprinkled inside and outside with a 40 per cent solution of formalin and placed in the room to be fumigated. The room was tightly sealed and formaldehyde gas in large quantity was forced into the room through a keyhole. The room was closed for twenty hours. The room was then opened the next morning, and all the paint work, movable articles, and the floor were thoroughly washed with a solution of bichloride of mercury, 1–500. Men were not allowed to enter this room until it was dry.

Disinfection of hospital.—On the afternoon of June 15 the room formerly occupied by the deceased, together with the two adjoining rooms, the two sleeping rooms of the nurses, and the room containing the baggage of the deceased were similarly disinfected. During the illness of the deceased all the soiled linen and towels were placed in a solution of bichloride of mercury, 1–500. All instruments used at the autopsy were thoroughly sterilized by boiling. All the effects of the deceased were disposed of by burning. The body was wrapped in a sheet previously dipped in a solution of bichloride of mercury, 1-500, then placed in a coffin with slaked lime. None of the marines were allowed to touch the coffin, it being handled by the undertaker and his assistant.

Second case.—The second case of yellow fever occurred in a machinist, second class, age 23, who was first seen on August 1, at 9 a. m. He had been taken with a violent chill on the evening of the 31st of July while on duty in the harbor as engineer of the steam launch. This chill was followed by high fever, vomiting, severe headache, and pains in the small of the back and hips, and he was restless for the balance of the night. At 7 a. m. August 1 he reported to the hospital steward with a temperature of 100° F., complained of being constipated, and was given a dose of salts. He was seen by the medical officer at 9 a. m. At that time he presented the symptoms of malaria, and an examination of blood, made some time later at the Army Hospital, revealed plasmodia in innumerable quantity. His temperature was 101.9° F., pulse 100, and respiration 20. At 4.30 p. m. the first urine was passed and contained 20 per cent moist albumen. His temperature at this time was 105.2° F., pulse 110, respiration 29. The amount of albumen in the urine increased rapidly and thirty-six hours after he was first seen there was 65 per cent. After forty-eight hours of illness the albumen gradually lessened, but was never absent. He died on August 5 at 8.55 a. m., the immediate cause of death being uræmia.

Third case.—This was a typical severe case, ending in death. S. H. B., private marine, age 30, was admitted to the list of August 13. It was determined that he was in the habit of frequenting gambling houses. He admitted having visited a house of ill repute on San Isidro street, but was unable to state definitely the last time that he visited this place. His name appears on the liberty list for the last time on August 5. On this date he stated that he only entered one building, that being a Chinese restaurant on Ricla street. This place was visited and found to be in a very dirty condition, frequented by all classes of people. On August 6 he was on duty at the entrance to the Admiralty building. From the afternoon of August 5 the men were not given any liberty day or night. It was not long after this order was given that the men found the way out of the barracks during the night. On one occasion, between 1 a. m. and 4 a. m. the return of several men was witnessed who had left the barracks after taps. He reported about noon on August 13 with a temperature of 103.2° F. and pulse of 120. He stated that he had been constipated for several a days and had retired the night before feeling tired. On the day of admission he had, however, eaten his usual breakfast. An examination showed face congested, eyes injected, gums spongy, tongue thick, tooth marked, and coated white; gonorrhœal discharge; skin dry and hot; areas of liver and spleen dullness increased. He complained of pain in small of back, hips, and shoulders, slight headache, and thirst. He was given three compound cathartic pills and removed to a room in a separate building. His effects were removed from the general quarters. The case progressed, presenting the usual symptoms, death occurring on the 18th.

Fourth case.—The fourth case, that of Seaman J., age 24, belonging to the barge's crew, quartered on the second floor of the Admiralty building, occurred on August 31, ending in recovery.

It was the patient's custom to visit the Mascotte Park every Saturday evening between the hours of 7 p. m. and 9.30 p. m. This park is situated in an insanitary part of Havana, bounded in front by the harbor and in the rear by the tenderloin district. It begins about 200 feet from the end of the Machina; it is about 600 feet long, and terminates at an old hospital just in the rear of the San Jose wharf. Every Saturday night a Cuban band plays at this park and probably some 300 people promenade at this place.

The patient reported on the 28th of August with the symptoms of malaria, and was treated for that disease until the 31st. On that date, at 9 a. m., he felt chilly and nauseated, had a severe headache, pain in the shoulders and small of the back, and was constipated. Temperature, 100.2° F.; pulse, 72; tongue thick, heavily coated, and tooth marked. The next morning his temperature was 101.2° F.; pulse, 70. He had pains in legs and thighs and was unable to stand up. He was nauseated and had intense frontal headache. During the course of the day his facies became characteristic—face congested; upper lip swollen, eyes injected, lower border of the conjunctivæ tinged with yellow, the upper half remaining white; the lower margin of the eyelids presenting a dark and purplish appearance; the gums spongy and showing a tendency to bleeding; intense pain in the stomach and front part of the head; liver dullness slightly increased. His body was sponged regularly every hour, and he was given ice-cold vichy every hour or as often as he demanded it. For his headache an ice cap was first applied; but as it was found that the weight of it increased the pain, ice-cold cloths were substituted and applied to the head. For the pain in the stomach towels dipped in ice water were applied. At 8.10 p. m. he urinated for the first time, passing 7½ ounces; urine highly colored, acid reaction; specific gravity, 1.025; no albumen. He tossed considerably during the night and had three passages from the bowels, not characteristic. He would occasionally awaken from his short slumbers nauseated; cracked ice was at once given him.

September 2: In the forenoon he was very restless and wanted to get up. 11.30 a. m., injected 15 c. c. of Doty's serum subcutaneously in the right lateral abdominal region (vial VIII–9–99). He then rested for a little while, and in thirty minutes his temperature had gone up one-tenth of a degree and his pulse diminished two beats.

3.30 p. m., injected 16 c. c. of the same serum subcutaneously into the left lateral abdominal region. Temperature then rose rapidly to 103° F., pulse falling to 73, 18 beats slower than after the first injection.

7.55 p. m., injected 16 c. c. of the same serum into the left lateral abdominal region. After this injection his temperature rose two-tenths of a degree and his pulse grew faster, increased by 25 beats. During the twenty-four hours ending 1 a. m., September 23, he had five actions from his bowels and passed 19½ ounces of urine, no trace of albumen being found. He suffered principally with his stomach (pain and nausea). A hot mustard poultice was applied for the pain over the stomach. He also suffered with retention of urine, which was relieved either by hot applications or the catheter.

September 3: Congestion of the face about the same, with a few exceptions; a dark circle around the eyes; the upper lip less swollen; a slight tinge of yellow noticeable in the entire conjunctiva; margins of the upper eyelids dark (perceptible when the patient's eyes are closed).

7.05 a. m., 16 c. c. of the serum were injected into the right iliac region. In two hours his temperature fell six-tenths of a degree and pulse was eight beats slower.

11 a. m., injected 25 c. c. of serum into the left iliac region, tem-

perature rising two-tenths of a degree, pulse increased by two beats. His abdomen was very tender, due especially to the injections; towels dipped in ice-cold water were applied and frequently changed.

2.30 p. m., catheterized and 175 c. c. of urine withdrawn; a trace of albumen was found; this trace was present for seventy-two hours; total quantity of urine passed for the twenty-four hours ending September 3, 17 ounces.

September 4: He slept very little during the night and was nauseated, wanting to vomit frequently. This morning he showed signs of exhaustion and is getting weaker. He was unable to pass urine and catheter caused him much pain. The only thing that seemed to strengthen him was a cold sponge bath. He vomited a wine-colored matter containing black specks (flies wings). He then complained of a bad taste in the mouth; his tongue and lips were bleeding; he had several watery passages to-day and passed some blood in his stool; his face was not as much congested; icterus of conjunctiva plainly visible; tongue pointed with a red tip and border; total quantity of urine passed for the twenty-four hours ending September 5, 19 ounces, with a trace of albumen.

September 5: He was doing as well as could be expected; I began to nourish him, first by the rectum, later by the stomach; preference was given to chicken broth; 1 ounce every two hours for the twenty-four hours ending September 6.

September 6: Malted milk, 1 ounce, by the stomach every two hours; chicken broth, 2 ounces every two hours by the rectum.

September 7: Nourishment slightly increased.

September 8: I reported him convalescing. He was given food very cautiously, and was not permitted to leave the hospital for six days after convalescent.

He was discharged to duty September 14.

Altogether 88 c. c. of Dr. Doty's serum were injected subcutaneously into the loose cellular tissue of the abdomen, and six days later an eruption appeared, first over the place where the serum was injected, and later over the entire abdominal region, lumbar region, inner side of the thighs, calves of legs, chest, inner side of arms, anterior part of the forearms, hands, and feet.

This eruption was slightly elevated from the skin and markedly indurated. At first it was red and in patches, but upon being rubbed its color changed to a golden red, finally disappearing. It lasted about two days after convalescence and was marked by itching.

Fifth case.—F. E. O., machinist, first class, age 29, was admitted to the list on September 27. On the night of September 22 he was out during the rain and returned to the Machina about 10 p. m. slightly under the influence of liquor. On the morning of September 26 he went to the navy-yard on duty in the steam launch, and in company with B., a landsman, chased one of the many buzzards which infest that place, both men getting very much exhausted and overheated. O. then drank a large quantity of cool water and returned to the Machina about 11 a. m. feeling very tired. He made another trip to the navy-yard during the afternoon of the same day. Early on the morning of the 27th, at 2 a. m., he was seized with a chill and felt cold, uncomfortable, and restless for the balance of the night. The usual symptoms supervened, projectile black vomiting occurring on October 3, and death on the 4th.

Another case of yellow fever occurred on September 27 in the person of B., a landsman, who had suffered the same exposure at the navy-yard as O., the preceding case. While all the physicians who saw B. did not concur in the diagnosis of yellow fever, it was considered to be a genuine case of that disease and was so returned. His disease ran a characteristic but mild course, and he was discharged to duty on October 11.

The seventh case occurred on October 19, and its history is given in some detail, as it presented remarkable features and was one of two that recovered after treatment with Sanarelli's serum. L. D. F., hospital steward, age 27$\frac{3}{12}$, was admitted to the sick list on October 19.

Before going into the details of this case the following symptoms, that were present during the progress of his illness, are briefly enumerated:

I. Chilliness on the evening of October 19, followed by a decided chill (fifteen days after the death of O., who died on October 4).

II. Cephalalgia and intra-orbital pains.

III. Projectile vomiting (he stated that he was unable to prevent himself from vomiting and that the vomitus came out from his mouth just as it would from the nozzle of a hose).

IV. Rachialgia.

V. High temperature—104.1° F.

VI. Hemorrhages from the stomach, gums, ears, nose, rectum, and urethra.

VII. Black vomit.

VIII. Albuminuria (40 per cent of moist albumen being the largest amount present during the progress of the case).

IX. Delirium.

X. Collapse.

XI. Slow convalescence.

The above symptoms will be referred to in detail, as they occur from day to day.

Possible sources of infection.—Although he assisted in caring for yellow fever patients in the sick quarters it is not believed that he contracted his illness from that place, for the following reasons: First, the last case of yellow fever died October 4, fifteen days previous, and this is considered a very long period of incubation; second, the hospital was so thoroughly disinfected immediately after the death of O. that it would seem impossible for anyone to have contracted fever from that place.

Probable sources of infection.—First, he occupied quarters in the dispensary of the Machina, and slept with the doors wide open. This dispensary is near the mouth of one of the largest sewers that empties into the harbor, and when the tide is low the odor coming from this sewer is very marked. This, in all probability, might be the cause of fever, should a body of non-immunes sleep or be quartered near this place. Second, he was in the habit of taking a walk every afternoon, always returning by Oficios street, which ends on the outside wall of the Machina. There have been a number of cases of yellow fever on this street, all terminating in death. Third, the streets were very muddy on and about October 18 and 19, the rain having fallen almost every day of the month.

His family and personal history was very good. He had never used intoxicating drinks and had never had malaria, although he had lived for many years in a malarial country.

He had been in Havana about ten months and had been living at the Machina about six months, during which time he had been constantly thrown in contact with cases of yellow fever.

On October 15 he had a severe heartburn and a peculiar pain in the abdominal muscles and was nauseated. This was followed by diarrhea, which lasted up to the time of his chilliness.

On October 19 he ate breakfast and dinner with a fairly good appetite; at supper he did not eat much. At about 5 p. m. he began feeling weak and tired, and felt like lying down, but instead took a walk up Ricla street to the Prado, through Central Park to Obispo street, to Oficios street, and Teniente-Rey street, where he stopped to get a glass of lemonade. Immediately after drinking the lemonade he began to feel cold and returned to the Machina about 6.30 p. m. He sat down in the dispensary for a short while and tried to read. He suddenly put the book down, feeling chilly, and asked the hospital apprentice if he felt cold. On receiving a negative answer he took his temperature. The thermometer registered 100.3° F. He did not pay much attention to this small rise of temperature, as he attributed his tired feeling and pyrexia to a small boil in the left axilla, which he had been trying to abort for the past few days.

About 8 p. m., while disrobing to go to bed, he had a distinct chill, which shook his whole body. He then took three compound vegetable cathartic pills and eight grains of quinine sulphate in tablet form and went to bed. He slept fairly well up to 10 p. m., when he awoke with a severe frontal headache, which seemed to be in the bones of his skull, and a desire to go to stool. He felt nauseated and started for the closet, a distance of about 25 feet from the dispensary, but before he reached the place he vomited over the ground (this place was disinfected the next morning). After he reached the closet he had a very good action from his bowels and hurried back to bed. He did not remain there very long, however, having to return to the water-closet, where he had another action from his bowels. He then returned to bed; and from this time up to 6 o'clock in the morning he was heard tossing and groaning by the watchman who was on watch during the night.

First day, beginning 5 a. m. October 20, ending 5 a. m. October 21.—About 5 a. m. the watchman of the Machina came to my room and informed me that the steward was sick. I hurried down to see him, and found him in his bed in the dispensary. His face, which was pale in health, was now flushed and congested. His ears were markedly red. The lower margins of the upper eyelids were cyanotic; the skin was hot and dry; the conjunctiva injected, and the sclerotics tinged with yellow. The upper lip was slightly puffed or swollen, the lower one was very red; the gums were pink and firm; the tongue was thick, slightly coated, and not indented or tooth marked. He felt nauseated, and had a bad taste in his mouth. He was complaining of severe pains in the front part of his head, over the loins, and in the back of his neck. There was some tenderness in the epigastric region and extending a little distance to the right of the median line. The liver dullness was slightly increased in the mammary line; splenic dullness seemed normal. Temperature, 100.2° F.; pulse, 104.

After being sponged with hot water and mustard for about twenty minutes, he was dried and covered with a blanket and carefully removed (carrying bed and all) to the sick quarters and watches kept. As soon as he was in the hospital something was done to relieve the terrible aching pains in the head—an ice cap was first tried, but it only caused an increase of pain, due probably to the weight of the ice cap, so that towels dipped in ice water and frequently changed were substituted. His temperature was taken every hour and a sponge bath given with ice cold water every hour if the temperature reached 102° F. or over.

At 8 a. m. his temperature was rising, having already reached 101° F.; pulse 115. Three to 6 ounces of cold water (vichy) were ordered and given as regularly every half hour as possible.

8.25 a. m.: Immediately after drinking 3 ounces of vichy water he had projectile vomiting. This vomited matter was examined and found to be of a decidedly acid reaction and to contain principally water, mixed with red blood, mucus, and the characteristic of black vomit—black specks, or "flies' wings." The early appearance of "flies' wings" in the vomited matter of this disease is a very bad prognostic sign.

9 a. m.: By this time his temperature had risen to 103.8° F.; pulse 120. He was then given a sponge bath with ice water, but this did not have any immediate effect on the temperature. His pulse lowered somewhat, beating 109 to the minute.

10.45 a. m.: After carefully asepticising the lobe of the right ear, two specimens of blood were taken and sent to the Army laboratory. Two days later it was learned that the cover glasses, which had been placed over the drop of blood on the slide, had smeared the specimen to such an extent that it was impossible to get a report from the bacteriologist. The patient was so nervous by this time that it was decided not to disturb him any more than was absolutely necessary, and no effort was made to obtain other specimens of blood.

At noon his temperature had dropped to 101.8° F.; pulse 96. In the afternoon his temperature began to rise again very rapidly.

1.30 p. m.: He passed the first urine, 256 grams, of a straw color, highly acid reaction; sp. gr. 1.025; bile, and a thin trace of albumen (Heller's test).

1.50 p. m.: He vomited again, about one pint. It was the same as the first vomit, with the exception that there was more blood in it and it was of a darker color, and contained a larger number of black specks ("flies' wings"). Fifty minutes before vomiting his temperature was 102.8° F., and 20 minutes after vomiting his temperature dropped 0.6° F.

2 p. m.: His stomach had become so painful and irritable that a large hot mustard poultice was applied over the epigastrium.

Between 3 and 10 p. m. his temperature ranged between 102° and 103° F., never rising above, and only once falling below 102° F., the latter reading being immediately after a cold sponge bath, when it fell 0.2° F. and remained there only a short time. During the seven hours just passed, his pulse ranged between 76 and 99 beats per minutes; resp. from 18 to 25.

8.50 p. m.: He vomited a third time, the vomitus consisting principally of water mixed with mucus, which was streaked with red blood, and also contained "flies' wings." Just thirty minutes previous to his vomiting, his temperature was 102.4° F.; pulse 86; and ten minutes after vomiting, his temperature rose 0.6° F.; pulse fell to 76.

At 10.25 p. m. he passed 224 grams of urine, which was highly colored, and cloudy, having a very strong odor, an acid reaction, sp. gr. 1.025, bile, and 2 per cent of moist albumen. The early appearance of this quantity of albumen, together with the other symptoms present made the case appear exceedingly grave from the start.

From 10.30 p. m. to 11 p. m. he was extremely nervous, crying aloud and tossing in bed from side to side; nothing seemed to quiet him. At 10.30 p. m some of Sanarelli's serum was obtained from the yellow-fever hospital at Las Animas, and at 11 p. m. the patient was prepared for its reception. One of the nurses was instructed to carefully cleanse her hands and then to boil the syringe, which was to be used. After boiling the instrument and needle and washing them inside and outside with a 5 per cent solution of carbolic acid, they were then wrapped in a towel, which had been dipped in boiling water and wrung dry. In the meantime, I carefully disinfected my hands, paying especial attention to my nails, then proceeded to sterilize, or rather asepticise the abdomen in the following way: First by washing with warm water and soap, then washing off with sterile water, then by carbolized solution, and lastly by washing off with alcohol.

The patient complained of considerable pain on the left side, so the right iliac region was selected for the first injection.

The Sanarelli serum is put up in thick, hermetically sealed bottles, containing 20 c. c. of serum; the capacity of the syringe, being only 8 c. c., in order to avoid the necessary pain in making more than one puncture, as the dose should be 20 c. c., I decided to leave the needle in its place, or position, and unscrew the syringe, taking care not to force any air in the needle.

The first dose of the serum was injected subcutaneously into the cellular tissue of the right iliac region at 11.30 p. m., twenty-seven hours after his chill, and the puncture made by the needle covered over with iodoform collodion. A large towel folded in half and dipped in ice-cold water and frequently changed was then applied over the abdomen, and continued for several days thereafter.

His temperature at 10 p. m. was 102.8° F.; pulse 80; respiration 24. At 11.30 p. m., thirty minutes after he had received the first dose of the serum (20 c. c.) his temperature rose to 103.4° F.; pulse 78; respiration 25. He was very much quieter and fell into a natural sleep, not lasting very long. From 11.30 p. m. to 5 a. m. his temperature ranged between 103° F. and 103.8° F.; pulse from 78 to 86; respiration between 23 to 26.

He had several short naps during the course of the night; he had had a very good action from his bowels at 4.45 p. m.

During the first twenty-four hours that he had been under observation he passed 480 grams of urine, containing 2 per cent of moist albumen; he was given nineteen sponge baths during the first day, fourteen before and five after the injection of the serum. The first sponge bath was with hot water and mustard; the second with ordinary cold water, but not deriving much benefit from the latter, I tried, and with more success, ice-cold water sponging; each sponge bath lasted from ten to twenty minutes, and included the entire body, arms, and legs. Towels dipped in ice-cold water, and frequently changed, were kept constantly over his head and abdomen, the first relieving the severe cephalalgia, and the latter the intense heat from the hot, burning skin of the abdomen. I succeeded in causing him to drink 74 ounces of ice-cold vichy (Celestin), during the first day; at one time he grew tired of the vichy and ice-cold lemonade, made with vichy, was substituted, which he drank with much pleasure.

Second day, beginning 5 a. m. October 21, and ending 5 a. m. October 22.—6 a. m.; his temperature was up to 103.8°F.; pulse 77; respiration, 25. He was not as nervous and restless as on the previous day; his face was still congested and there was marked capillary stasis; the conjunctivæ were injected and the sclerotics more heavily tinged with yellow than on the first day. There was a hæmorrhagic spot in the right sclera, the size of a small pea; the gums were beginning to break down and were bleeding; this was more marked with the gums of the upper jaw; small, minute hæmorrhagic spots were seen on the helix of the ears. He expectorated occasionally a heavy, rusty colored, frothy sputum.

The same treatment as on the previous day, with a few additions, was continued; namely, ice-cold sponge baths, ice-cold towels to the abdomen; in addition, an enema of 1 quart of warm water and half an ounce of sulphate of magnesia, to be given every twelve hours, and his mouth to be washed twice daily with either a solution of bicarbonate of soda or listerine.

The first enema was given at 6.30 a. m. It was retained ten minutes, when he had a very good evacuation and passed 64 grams of urine, which was cloudy, having a strong odor, acid reaction, sp. gr. 1.025, bile, and 1 per cent of albumen. It was encouraging to see that the albumen had already diminished to half the quantity that was present during the first day of illness, but his temperature was still rising, while the pulse was falling all the time. Sometimes an ice-cold sponge bath would bring down his temperature 0.2° F., but it would rise again in a short time.

At 8 a. m. his temperature was 103.7° F.; pulse 90; respiration 25; and after sponging him all over with ice-cold water, his temperature dropped 1.9° F.

At 9.10 a. m. his temperature was 104.1° F.; pulse 99; respiration 27; it was now nine hours and forty minutes since the first injection of serum had been given, and about thirty-seven hours and ten minutes after the chill. The patient was carefully prepared in the same way as for the first dose of serum. The second dose of 20 c. c. of serum was injected subcutaneously into the loose cellular tissue of the left iliac region at 9.30 a. m., and ten minutes later he was sponged with ice-cold water. His temperature after the bath was 103.6° F., 0.5° F. lower than before the injection of the serum.

During the five and one-half hours between 9.30 a. m. and 3 p. m. his temperature fluctuated between 103° F. and 103.9° F., only on one occasion falling below 103° F., that being after the sponge bath; the ice water brought down his temperature 0.6° F. below 103° F., and it remained there about thirty minutes. During the same space of time his pulse ran between 74 and 90; respiration from 25 to 28 per minute. He was very nauseated and his stomach very irritable, the only thing which seemed to quiet the congested, inflamed, and irritable stomach being crushed ice, which was given him very often, he himself calling for it on several occasions. Another thing which helped to quiet as well as to diminish the pain in the stomach was the constant and continuous application of towels dipped in ice-cold water and wrung out.

Notwithstanding these measures, at 10.50 a. m. he vomited about one pint of dark, black blood, which was mixed with mucus and containing a considerable quantity of black specks (flies' wings), some floating on top, others precipitating to the bottom. Twenty minutes before vomiting his temperature was 103.7° F., pulse 84, respiration 27, and forty minutes after vomiting his temperature rose 0.2° F., pulse decreased 10 beats, respiration numbered 25. His bowels were well open, having had three actions in five and one-half hours, the last two containing a large quantity of dark, black matter, presumably blood. His kidneys were also acting freely. The patient was very talkative during the first part of the day, and tossed in bed a great deal.

Between 3 and 10 p. m. he was doing as well as could possibly be hoped or expected; his temperature was ranging between 102° and 103° F., and once during these seven hours his temperature was reduced to 101.8° F.

At 3.05 p. m. he vomited some dark, black blood, with considerable mucus and flies' wings. This vomited matter was highly acid. After vomiting he fell asleep for a little while. His temperature fifteen minutes before vomiting was 103.4° F., pulse 78, respiration 28. On wakening he was very irritable and nervous, and his temperature was not taken until one hour and twenty-five minutes after vomiting. It was then noticed that his temperature had fallen 1.4° F.; pulse was increased by 2 beats.

At 5.25 p. m., after an intermission of eight hours, the patient was again prepared in the same manner as prescribed for the first two injections of serum. The case was now about forty-eight hours old, that is, forty-eight hours since he had his chill. The only tender or sensitive part of the abdomen was in the epigastric region. The place where the needle was inserted in giving the second injection of serum was a little inflamed, but no pain was attached to it. The left iliac region was again selected, and 20 c. c. of Sanarelli's serum again injected into the loose cellular tissue of this region. Fifteen minutes before the injection of the serum his temperature was 102.8° F.; pulse 80, respiration 28. Thirty-five minutes after the injection of the serum his temperature had risen 0.2° F.; pulse remained the same (80); respirations slightly increased, now numbering 32.

At 5.50 p. m. he vomited a small quantity of very black blood. His kidneys were functioning well, and the urine of the afternoon was examined; the color was pale straw, cloudy, and acid reaction, a strong odor; sp. gr. 1.015, bile, and 2 per cent of moist albumen.

At 10 p. m. he was doing nicely, apparently sleeping, when, as I was about to leave the room, my back being turned to the bed, giving instructions for the night to the nurse, he suddenly jumped out of bed, and before we got him back he had urinated and defecated involuntarily over the floor. He at the same time vomited bloody matter, was partially delirious, and wanted to get up. I spoke and tried to convince him, but without any effect. I then held him down in bed and threatened him. He then said that he would be quiet and listen to whatever I said.

He was now perspiring freely, and was sponged with ice-cold water and fell asleep.

At 11 p. m. he awoke; temperature, 102.6° F.; pulse, 88; respiration, 24. From 11 p. m. to 5 a. m. his temperature ranged between 101.2° F. and 102.6° F.; pulse between 78 and 88; respiration from 24 to 34. During this space of time he seemed to have lost control of the sphincter muscles, having had an involuntary action in bed, urinating at the same time. The bed pan and urinal were then kept in place for a short time. He was now very nauseated, and was unable to articulate properly. He seemed to have lost control of his vocal chords, and he also swallowed with great difficulty.

At 2.25 a. m., while he was drinking ice water out of a feeding cup, he suddenly surprised the nurse by sitting up in bed. He would have perhaps jumped out of bed had not the nurse been very near him. I was sent for, and again threatened him and he quieted down.

At 2.30 a. m. he vomited a very greenish, watery fluid, with mucus and black specks (flies' wings). His temperature ten minutes before vomiting was 101.6° F.; pulse, 88; respiration, 26. One hour after vomiting his temperature was 102.1° F.; pulse, 84; respiration, 25.

During the second day he was given twenty sponge baths with ice-cold water; he drank 87 ounces of ice-cold lemonade, made with vichy water; he was given two enemas of one quart each of warm water and one half ounce of sulphate of magnesia; he had in all nine evacuations, two of which were involuntary and seven voluntary; he passed urine twice involuntarily, once in bed and once on the floor, besides the 1,750 grams of urine which was collected during the twenty-four hours; the color was pale amber, reaction highly acid; sp. gr. 1.010, bile, and 2 per cent of moist albumen. He vomited five times during the twenty-four hours just passed

Third day, beginning 5 a. m. October 22, ending 5 a. m. October 23.—The patient was in a more depressed condition; the stomach was more irritable; there was partial retention of urine; the quantity of urine diminished; the specific gravity was lower; albumen was increasing in quantity; he was very nervous, more than on the previous day; somewhat irritable and partially delirious, in a semicomatose condition. All the mucous membranes were bleeding; a smaller quantity of water was being taken, and the above symptoms marked the twenty-four hours that followed.

From 5 to 10 a. m. his temperature ranged from 101° F. to 102.5° F.; pulse, from 71 to 82; respiration, from 26 to 32.

At 6.50 a. m. he was given an enema, and immediately afterwards became very nervous and tried to get up; he had to be held in bed; he was partially delirious and unable to articulate properly.

At 10 a. m. his temperature having reached 102.5° F., he was given a sponge bath with ice-cold water; his temperature was taken immediately afterwards, and it registered 0.1° F. higher than before the bath; that is, 102.6° F.

At 10.20 a. m., five minutes after having drank 1 ounce of ice-cold lemonade vichy, he vomited about one-half pint of dark, black blood (black vomit) mixed with mucus; there was also a large number of flies' wings in the vomited matter, which, after being allowed to settle, precipitated a very dark, black matter.

At 11.15 a. m. his temperature was the same, 102.6° F.; pulse, 75; respiration, 34. His facial expression was more characteristic of a grave case of yellow fever; he had an anxious expression; his eyes were beginning to become hollowed, with dark circles; there was a marked cyanotic border along the lower margin of the upper eyelids; the conjunctivæ were still injected and the sclera of a light yellow color; the hæmorrhagic spot in the lower right sclera was larger, as if diffused; there was marked capillary stasis; there was a faint icterus of the face, neck, and upper third of the body; the upper lip was still congested, and both were very dry; the gums were spongy and bleeding, and the lower ones beginning to desquamate and exfoliate. Whenever he vomited or made an attempt to expectorate, his tongue, gums, and mouth would bleed freely; his tongue was notably thick, heavily coated with a greenish white fur, having red borders and tooth marked; his throat was very dry, and he swallowed with great difficulty. The pulse was rather fast but strong, and not giving any indication of weakness. The respirations were exaggerated, but apparently there was no pain when breathing. The wounds in the abdomen, caused by the injection of the serum, were neither swollen nor tender; the patient was not complaining of any particular pain. The morning urine was examined; it was a light amber color, having a faint odor and acid reaction, specific gravity 1.008, bile, and 5 per cent of moist albumen present.

From 11.15 a. m. to 4.15 p. m. his temperature ranged from 102.6° F. to 103.1° F.; pulse ran from 75 to 84; respiration, from 30 to 35.

During the five hours that have just passed he rested better than at any other time. He was nauseated and wanted to vomit several times, but was prevented from so doing by the immediate internal administration of crushed ice. Although his pulse was a little higher, it was nevertheless a good pulse, strong and full, and not requiring any stimulants as yet. Several times during the day he complained of dizziness.

From 4.15 p. m. to 1 a. m. his temperature had gradually fallen 1.8° F. In the nine hours his pulse fell steadily from 84 to 64; respiration from 31 to 27.

Owing to the excessive hæmorrhage from the mouth, it became necessary to wash his mouth frequently, listerine being used; first 1 dram being used to a tumbler of water, then rinsed with ice water alone; he had several hæmorrhages from the bowels, passed involuntarily as coagulated clots of blood, mixed with mucus, and having a very offensive odor.

He was now complaining of his throat; there was pain whenever he attempted to swallow. He had not urinated for several hours, and after percussing over the bladder it was found to be distended; towels dipped in hot water and frequently changed were then applied over the pubis; this only caused him to pass 30 grams of urine. It was then decided to catheterize him, and this was done regularly every eight hours.

From 2 a. m. to 5 a. m. his temperature ranged between 101.9° F. and 102.2° F.; pulse from 83 to 74; respiration from 30 to 32.

The treatment this day was slightly modified from the previous days: first, he was only given eleven sponge baths during the entire twenty-four hours; second, only 17 ounces of ice-cold vichy lemonade were taken by the patient, but he drank considerable water in the form of crushed ice. He was given three enemata during the twenty-four hours, two of which consisted of warm water, 2 quarts, sulphate of magnesia, one-half ounce, with an intermission of twelve hours between the two. The third enema consisted of 1 pint of ice-cold lithia water; most of this was retained, and absorbed.

He vomited black once, but was nauseated the entire day.

He passed 1,325 grams of urine, specific gravity being 1.010, bile, and 5 per cent of moist albumen.

He had eight actions from his bowels; five were voluntary and three were involuntary; all three of the involuntary stools were principally dark, coagulated, and decomposing clots of blood; all the stools contained more or less blood and mucus. Considerable flatus was also expelled.

At 4 a. m. October 23 he was given the first dose of stimulant—strychnine sulphate one-thirtieth grain by the mouth; this was retained.

Fourth day, beginning 5 a. m. October 23, ending 5 a. m. October 24.—With the exception of the facial appearance, there seemed to be nothing unusual in his condition. He was apparently doing well; his stomach was much quieter than it had been before, although he was still nauseated, and wanted to vomit several times; he swallowed with great difficulty, and only took crushed ice; this he would keep in his mouth until it was melted, then swallow drop by drop.

The previously relaxed sphincters were in better condition on this day; he had control over the rectal and vesical sphincters. It became necessary to catheterize the bladder, as hot fomentations had no effect whatever.

From 5 a. m. to 10 a. m. his temperature ran between 102° F. and

102.2° F.; pulse from 74 to 78; respiration from 31 to 34. He was able to articulate a trifle better to-day, and on one occasion asked permission to get out of bed, and on receiving a refusal he attempted to do so, but was prevented by the nurses.

His skin was acting freely, being always moist; the face had a peculiar ruddy color, more marked over the cheek bones and extending on either side of the nose; the color of the skin of the forehead and neck was that of very light mahogany; the eyes were hollowed, with dark circles surrounding them; the lower margins of the upper eyelids were markedly cyanotic; the nose was somewhat pinched; the ears were of a dark red color (capillary stasis marked); lips red; gums covered with a white epithelium and exfoliating, leaving them red and bleeding; eyes injected; sclera yellow; tongue pointed, red tip and border, and covered with a white fur; two hæmorrhagic spots in the lower half of the right conjunctiva. He was not complaining of any particular pain, but his stomach was still sensitive to the touch, and accordingly the treatment was modified considerably. His whole body was sponged; the cold applications over the abdomen continued throughout the day and night, and not being able to swallow much water he was slowly given one high enema of ice-cold vichy water every three hours. Most of this was retained. The patient was getting weaker and weaker.

From 10 a. m. to 6 p. m. his temperature kept coming down gradually. It now ranged from 100.7° F. to 102.2° F.; pulse from 75 to 81; respiration from 30 to 34. He was much quieter, and at 2 p. m., finding his temperature 101.9° F., pulse 75, respiration 33, it was decided to try to give him a little nourishment, and accordingly some malted milk was prepared (2 drams of malted milk to 3 drams of water). One and one-half drams of this food was given by the mouth and 3½ drams given by the rectum. The alimentary tract retained these without any inconvenience, and thirty minutes later his temperature was taken and it registered the same as before taking the nourishment; the pulse had increased two beats; the respiration was now 30.

From 6 p. m. to 12 p. m. his temperature varied from 101.9° F. to 100.4° F.; pulse from 70 to 75; respiration from 31 to 33. He rested a little during this space of time, but it was difficult to determine the amount of sleep he had, as he was in a semi-comatose condition almost all day.

From midnight to 5 a. m. his temperature ranged from 100.5° F. to 101.4° F.; pulse from 68 to 76; respiration from 30 to 33. He was slightly nauseated during this space of time.

During the twenty-four hours just passed his face and body were sponged seven times; he drank 8 ounces of ice-cold lithia and 33 teaspoonfuls of crushed ice was also given; he was given, slowly, 9 high enemata of ice-cold lithia water, each enema measuring 1 pint, most of which was retained, only 3 or 4 ounces being expelled.

He had two good evacuations from the bowels, both of which were yellow. He was catheterized four times during the twenty-four hours, withdrawing in all 1,560 grams of urine, having a light amber color, a faint odor, acid reaction, sp. gr. 1.010, bile, and 2 per cent of moist albumen present. This was very encouraging. He was given by the mouth one-tenth grain of strychnine sulphate during the twenty-four hours. He was also given 1½ drams of malted milk. Three and one-half drams of malted milk were also given by the rectum.

He urinated involuntarily once, passing a small quantity of urine, sufficient to soil the bedclothes. On two occasions he tried to get out of bed, but was prevented. His back was rubbed with alcohol three times during this day.

Fifth day, beginning 5 a. m. October 24, ending 5 a. m. October 25.—The patient was doing well and strong hopes were entertained of his recovery, the chances being in his favor. He was much quieter, spoke plainer, and answered questions promptly.

From 5 a. m. to 12 noon his temperature ran between 100.4° F. and 101.9° F; pulse ranged from 68 to 79; respiration from 29 to 33. He would ask questions and suddenly doze off, showing that he was still suffering from stupor. He passed urine this morning without the assistance of the catheter and he absolutely refused to drink any more water, vichy, or lemonade. He was then persuaded to try apollinaris, which he drank in small quantities. His throat still pained him a little, and this was the principal reason why he did not care to partake of any more fluids. His temperature being low, the sponge bath was reduced to one every six hours. His stomach was very much quieter, and 6 drams of malted milk, as previously prepared, were administered by the mouth every half hour. This did not cause any irritation of the stomach. His temperature rose 0.8° F.; pulse increased 7 beats.

The facial appearance to-day was much better than on the previous day, although the color of the skin of the face and neck was nearing that of a dark mahogany. The eyes were the same as on the preceding day, with the exception of another hæmorrhagic spot the size of a small pea in the lower half of the left sclera; the lower margin of the upper eyelids was still very dark; epistaxis from the left nasal cavity; gums sore and covered with a white epithelium, which desquamates and peels off readily when gently rubbed with the finger, leaving the gums very red and bleeding; the tongue was thick and thickly coated with a dirty white fur, pointed, having a red diamond tip and red border. There was no pain, but slight tenderness on pressure over the epigastrium.

At 11.10 a. m. his temperature was 101.6° F.; pulse 77; respiration 33. Six drams of meat juice were given him by the mouth, and at 12.30 p. m., one hour and twenty minutes later, his temperature had fallen 1.1° F., pulse and respiration remaining the same.

From 12.30 p. m. to 8 p. m. his temperature ranged between 100.3° F. and 103° F, pulse from 72 to 79, respiration from 30 to 34.

At 5.35 p. m. he was given 1 ounce of chicken broth by the mouth, his temperature thirty minutes before being 102.1° F.; pulse 76; respiration 31, and twenty-five minutes after having taken the broth his temperature had fallen to 101.2° F.; pulse remained the same; respiration was now 32.

At 8 p. m. his temperature was 100.3° F.; pulse, 74; respiration, 30.

At 8.45 p. m. 1 ounce of chicken broth was again given by the mouth, and at 9 p. m., fifteen minutes later, his temperature had risen 0.4° F.; pulse was the same; respiration, 31.

From 10 p. m. to 1 a. m. his temperature ranged from 100.2° F. to 101.2° F., pulse from 68 to 77, respiration from 33 to 35.

From 1 to 5 a. m. he would doze off for a half hour at a time and wake up suddenly, very restless. This restlessness only lasted a few minutes, when he would doze off again. During this time his temperature ranged between 101.2° F. and 99.6° F., pulse from 74 to 77, respiration from 32 to 35.

During the twenty-four hours just passed he was given one hot-water sponge bath, and his body sponged with cold water four different times, each sponging lasting ten minutes. His body was rubbed with alcohol twice; he was given 15 teaspoonfuls of crushed ice and about 35 ounces of ice-cold apollinaris water. One-tenth grain of calomel was given as a diuretic. He was also given one-thirtieth grain strychnine sulphate by the mouth. He passed 1,437 grams of light amber urine having an acid reaction, sp. gr. 1.010, bile, and 4 per cent of moist albumen present.

Sixth day, beginning 5 a. m. October 25, ending 5 a. m. October 26.—From 5 a. m. to noon his temperature fluctuated between 103° F. and 101.5° F., pulse from 72 to 77, respiration from 31 to 35. He seemed to be doing very well and appeared to rest for a longer time, then would fall asleep again.

The skin of the body was of a light-yellow color; the skin of the face and neck was purplish; the skin was moist; the sclerotics were yellow, and the hæmorrhagic spots seemed to be more diffused than yesterday; his stomach was not irritable, and his kidneys were functioning well, but he suffered from retention of urine, and whenever his bladder became distended it caused him to become very restless. One additional and at the same time a very alarming sign was the peculiar muscular twitching which is characteristic in this disease; also a desire of the patient to pick at the nose and at the bedclothes. Certain muscles of the body seemed to be particularly affected by the icteroid toxine, namely, the facial muscles, then the muscles of the extremity, the muscles of the hands (the hand is closed, then picks up the bedclothes, then drops them), finally the flexor muscles of the forearms and legs. (This peculiar action of the flexor muscles was present in all of the cases of grave yellow fever that occurred at the Machina. I have also noticed it in other cases of yellow fever in the hospitals of Havana and in the fall of 1897 in New Orleans, La.; also in Key West, Fla., during my short stay in that city.)

The only thing which he seemed to need was nourishment, and accordingly 1 ounce of some liquid preparation was given every three hours.

From 1 to 10 p. m. his temperature ranged between 99.8° F. and 101.5° F., pulse from 72 to 75, respiration from 29 to 32. He was in much better condition, but was extremely weak; his eyes were hollowed, having dark circles around them.

At 9.15 p. m. 1 pint of hot black coffee was given by enema, and one hour later his temperature had decreased 1.1° F.; his pulse also decreased three beats; respiration remained the same.

From 10 p. m. to 5 a. m. his temperature ranged from 99.8° F. to 101.8° F., pulse from 72 to 76, respiration from 29 to 32.

During the sixth day he passed 1,445 grams of urine of a light amber color, acid reaction, sp. gr. 1.010, bile, and 8 per cent of moist albumen present. He was sponged eleven times with cool water and once with alcohol. Twenty-five ounces of ice-cold apollinaris and 13 ounces of ice-cold water were taken by the patient. The quantity of food taken by the mouth during the twenty-four hours was: Chicken broth 2 ounces, meat juice, 6 drachms, and malted milk 3 ounces. He was also given a nutritive enema of 1 ounce of chicken broth, and two enemata, one of warm water, 1 quart, sulphate of magnesia one-half ounce; the other consisting of 2 pints of hot black coffee.

He had five actions from his bowels, two very dark brown (probably due to the enema of coffee); the other three were of a light yellow color. He vomited once during this day, the vomited matter consisting principally of water mixed with mucus, streaked with blood, the black specks being still in evidence.

He was given two tonic pills composed of iron, quinine, strychnine, and arsenic.

Seventh day, beginning 5 a. m. October 26, ending 5 a. m. October 27.—The facial appearance of the patient was that of a dying man, and all who saw the patient this morning felt that the end was nearing. His expression was very anxious, as if pleading for something to relieve his suffering. I had him more carefully watched, two trained nurses being at his bedside constantly; two immune laborers in the adjoining room to give whatever assistance was necessary. The muscular tremor was again in evidence to-day, and at times his whole body trembled just as if suffering from a chill. This body tremor lasted from fifteen to twenty seconds. He still persistently refused to drink anything.

From 5 to 9 a. m. his temperature fell gradually from 99.7° F. to 99° F., pulse ranged from 68 to 70, respiration from 29 to 30. The skin of his face over the malar bones was purplish, and purple spots or patches were present over different parts of the face, hands, and posterior parts of the forearms and legs; the skin of the body was of a light lemon yellow color principally, and best seen over the abdomen and inner side of the thighs and arms. The sclerotics were yellow, showing the diffused hæmorrhagic spots in both eyes; the nose was pinched and bleeding; clots of coagulated blood were washed out of both ears; the mouth, lips, gums, tongue, palate, and inner sides of cheeks were bleeding, and the characteristic of black vomit (flies' wings) was present on the tongue; the skin was dry. The morning urine was examined; color amber, reaction acid, sp. gr. 1.012, bile, and 8 per cent of moist albumen present. On account of the irritation produced by the introduction of the catheter, I again commenced applying towels, dipped in hot water and wrung dry, over the pubis; this having been kept up for three hours, he passed 175 grams of cloudy urine, having a strong odor, an acid reaction, sp. gr. 1.012, bile, and 40 per cent of moist albumen present.

At 9.40 a. m. he suddenly collapsed. This was first noticed by the appearance of a heavy, beaded, cold perspiration over the forehead, chest, arms, and thighs. His hands and feet were cold. Hot water bags, and bottles containing hot water wrapped in towels, were immediately placed around the patient. The patient was now in a comatose condition.

At 10.20 a. m. his temperature was still 99.7° F., pulse 77, respiration 30. He was then briskly rubbed with lemons split in half, and alcohol, by two trained nurses and two immune laborers who had been detailed. This continued massage of the entire body was kept up for seven hours, when the four persons were reduced to two, one trained nurse and one laborer, on watch all the time.

The patient had a mouthful of coagulated blood; his gums were black, and he was unable to swallow; ice-cold champagne was dropped slowly into his mouth, about 30 drops to the minute.

At 11.10 a. m. I injected one-thirtieth grain of strychnine sulphate hypodermically into the muscles of the left arm. The hot-water bags and bottles were kept around him constantly.

From 11.15 a. m. to 3.15 p. m. his temperature fell gradually from 98° F. to 95.4° F. axillary, pulse from 68 to 75.

At 11.30 a. m. I catheterized him and drew 430 grams of very cloudy urine, having a very strong odor, an acid reaction, sp. gr. 1.010, bile, and 40 per cent of moist albumen present. The cloudiness was due to phosphates.

At 12.10 p. m. he vomited thin black matter, principally blood from the mouth, mixed with mucus.

At 4.30 p. m. his temperature had risen to 98.3° F., pulse 77, respiration 24.

At 5 p. m. an enema of hot beef tea was given slowly; this was retained. He was able to swallow now, and was given 1 ounce of ice-cold champagne every thirty minutes.

At 6 p. m. his temperature was 97.6° F., pulse 72, respiration 25. Massage with the half lemons and alcohol was renewed whenever the perspiration appeared on his face or body.

At 7.30 p. m. his temperature was 98.2° F., pulse 72, respiration 31.

At 8.05 p. m. a second enema of 1 pint of hot beef tea was given slowly; this was also retained. It was almost impossible to keep his body warm, and the rubber bags and bottles could not be dispensed with.

At 10.25 p. m. he vomited again, the ejected matter being black and containing some rusty colored mucus.

At 11.20 p. m. his temperature was 98.4° F., pulse 68, respiration 29, and from this time on until 4.15 a. m. his temperature ranged between 98.4° F. and 97.4° F., pulse between 68 and 78 and very good, respiration from 29 to 34. He was in a partial comatose condition, his mouth, tongue, lips, and gums still bleeding, and it was noticed that he swallowed most of the blood from his bleeding mouth.

During this day 1,645 grams of urine were obtained; 1,470 grams being drawn by the catheter, and 175 grams without the aid of the catheter; he vomited three times this day; he was given altogether one-fifth grain of strychnine sulphate, administered hypodermically; 40 ounces of ice-cold champagne were given by the mouth; he was given 3 enemata, each containing 1 pint of hot beef tea. He was also given 1 dram of whisky and 7 drams of milk by the mouth; considerable crushed ice was forced down into his stomach. His hands and face were sponged; cold towels applied over the abdomen; hot towels over the pubis; hot applications around the body, and an almost continuous massage, which lasted most of the twenty-four hours.

Eighth day, beginning 5 a. m. October 27, ending 5 a. m. October 28.—This day was marked with unusual interest. The patient was unconscious of his actions; was extremely restless and wanted to get out of bed; the skin of his face was dusky and spotted; the eyeballs were fixed in one position, never rotating; there was a peculiar twitching of the muscles of the face; the conjunctivæ were of a deep yellow color, showing the diffuse hæmorrhagic spots in each eye. The skin of the neck was purplish; the skin of the forehead was lemon yellow, more marked toward the root of his hair. His fingers, and occasionally his hands, flexed; the lips were still bleeding; his mouth was tightly closed, it being impossible to get him to open his mouth, therefore impossible to get him to drink anything. At times he expectorated small pieces of coagulated blood, which were very black; his pulse was good and strong, remaining below 70 most of the time; his feet and hands were cold, and the hot-water bags and bottles had to be replaced around the body; small mustard poultices were tied to the soles of each foot, to the palms of his hands, and still smaller ones were applied to each temple region, and a bandage placed around the head in order to hold them in position. The reason for tying the poultices to his feet, hands, and head was because he was unmanageable and had to be held down in bed most of the time. A general massage with lemons and alcohol was continued this day.

At 8 a. m. his temperature was 97.3° F., axillary; pulse, 62.

At 9 a. m. he was very restless, and after percussing over the bladder it was found to be distended and he was catheterized, 600 grams of urine being withdrawn. This relieved his restlessness for about thirty minutes, when he began fighting off the attendants and accordingly the massage had to be stopped.

At 12 noon his temperature was still falling, 97.3° F., axillary; pulse, 60; respiration, 26.

At 2.45 p. m. he fell into a natural sleep lasting about two hours, this being the first sleep that he had had for several days. He awoke at 4.45 p. m. feeling much better, and when asked if he would take a little iced champagne he replied by nodding his head, meaning yes. I then ordered that 4 drams or more be given every half hour.

At 5.35 p. m. his pulse was found to be rising and getting weaker. It was now beating 64 per minute.

At 6.20 p. m. he was given one-thirtieth grain of strychnine sulphate hypodermically. His temperature registered 98.2° F., axillary; pulse 72; respiration 32. He became very quiet, remaining in this condition until about 7 p. m., when he began rolling and tossing in bed from side to side, and suddenly, just as if struck by something, he jumped out of bed, striking the nurse and felling her. He then posted himself in one corner of the room and defied anyone to approach him. He tried to speak, but was unable to articulate and muttered all his words. I was sent for, but my presence did not seem to quiet him; on the contrary, he became infuriated, and when the attendants would try to get hold of him he would punch them off. I ordered two of the immune laborers, who were in the room with me at the time, to assist in getting hold of him, at the same time cautioning them not to seize him around the abdomen. He was overpowered and held down in bed. He was very angry with us all, and swore at us most of the time. He was perspiring freely and getting very weak.

At 7.50 p. m. it was impossible to take his temperature because he had to be held down in bed by four men for five hours. His pulse was 90; respiration 34. One-sixth of a grain of cocaine hydrochlorate was injected.

At 8.40 p. m. his temperature had reached 98° F.; pulse 100; respiration 43.

At 1 a. m. he fell asleep and became very quiet again, awakening at 3.35 a. m. His temperature had fallen 1° F. (97° F.); pulse had slowed to 60; respiration 36. He seemed to be perfectly rational, and asked many questions about the place that he was in and his condition.

At 4.30 a. m. he passed 355 grams of urine without the aid of the catheter. This urine was of a light amber color, having an acid reaction; sp. gr. 1.020; bile and 2 per cent of moist albumen present. During the twenty-four hours just passed he passed 955 grams of urine, 600 with and 355 without the aid of the catheter. He was given during that time one-fifteenth grain of strychnine sulphate and one-sixth grain cocaine hydrochlorate in cold champagne.

Ninth day, beginning 5 a. m. October 28, ending 5 a. m. October 29.—This day marked the beginning of a slow convalescence. The patient slept the greater part of the day. What was most feared was a relapse, and all necessary precautions were taken guarding against such a complication. We were more vigilant over his diet, and everything that was given was very carefully measured and noted down in order to avoid misfeeding him. The nurses were given special orders not to let anyone into the room, he being very hungry and continually asking for something to eat, and it was feared that he would attempt to get some food brought to him on the sly. He was conscious of everything that was happening around him, but did not seem to realize what would happen if he were to take more food. His expression was bright, and the wild, anxious, and infuriated look he had had during the few days passed was rapidly passing away.

The mucous membranes were bleeding no more and he urinated at will. On two different occasions he seemed to sink away. He was watched to such an extent and everything that transpired so carefully noted that I was made aware of his condition from minute to minute. I ordered that he be sponged every two or three hours with alcohol, and that he be given one ounce of the most nutritious liquid food every two hours. Freshly prepared chicken broth was selected.

At 7.10 a. m. his temperature was 97.1° F.; pulse, 70; respiration, 23; and ten minutes later he passed 365 grams of urine, containing 2 per cent of moist albumen. I tried to have him drink more champagne, but after having taken the first two ounces given him he felt nauseated, and for that reason it was stopped and ice-cold lithia substituted.

At 9.15 a. m., after having thoroughly prepared the left axilla, I opened a large boil in the left armpit. This boil had been noticed all along during his illness as a large inflamed axillary gland, which was hard and painful to the touch. About 5 ounces of thick, curdy, opaque, and bloody pus was discharged from this boil. The cavity was thoroughly cleansed and packed with iodoform gauze. (Touatre's remark, viz, that he had never seen a case of yellow fever where pus having formed the patient did not recover, was confirmed in this instance.)

His temperature fluctuated between 97.1° F. and 96.5° F.; pulse, between 60 and 70; respiration, between 23 and 26.

Beef-tea enemata were again given. He had four actions from his bowels during this day, all very black, probably due to the enema of beef tea; the stools contained some clots of blood and mucus. He urinated 970 grams of a light amber color, acid reaction, sp. gr. 1.010; bile and 2 per cent moist albumen present. He was given during the twenty-four hours 9 ounces of very carefully prepared chicken broth. He was also given 6 enemata of one pint each, 3 of hot beef tea, and 3 of warm water. One-tenth grain strychnine sulphate was given by the mouth. He drank 2 ounces of ice-cold champagne and 35 ounces of ice-cold lithia water. His body was sponged with alcohol and massaged nine times, each massage lasting from ten to twenty minutes.

Tenth day, beginning 5 a. m. October 29, ending 5 a. m. October 30.—His temperature was still subnormal, varying between 97.6° F. and 97.8° F.

There was one thing that happened this day which was of sufficient importance to be noted in detail. It was the appearance of a rather peculiar eruption. This eruption which made its appearance on the tenth day of the disease was slightly elevated from the epidermis, of no definite description, intensely itchy, and having a peculiar play of colors, rapidly changing in from ten to twenty minutes from bright red to a fading golden yellow. This eruption was in patches at first, isolated, and varying in size from that of a pea to that of a large bean, and they were indurated. The borders of the patches were nodulated; they were first isolated on certain parts of the body and later almost the entire body was covered with them, some being joined or mixed with neighboring ones. The size increased, and some reached the size of a silver dollar. The borders of the patches, however, never changed.

This eruption began first by an itchy sensation at the point where the Sanarelli serum was first injected, namely, the left and right sides of the abdomen. This itchy sensation necessarily caused the patient to rub the itchy part considerably. Immediately after rubbing the parts the patches were plainly seen. From the left side of the abdomen it made its appearance on the opposite side; next it was seen on the inner sides of the thighs, then the inner side of the arms and forearms, at the elbow joints, later the under surface of the knee and calf of the leg, and finally appearing on the thorax. A few isolated patches were distributed on the hands and feet.

He passed 2,005 grams of urine of a light straw color, slightly acid reaction, sp. gr. 1.016, trace of bile, and 2 per cent of moist albumen present. He had four actions from his bowels, principally water and mucus. The treatment this day was principally the dieting; he partook of chicken broth, 1 ounce every two hours, 6 ounces being consumed during the day. He also took 3 ounces of the juice of a broiled beefsteak. Nine ounces of ice cream were also given. His body was rubbed with alcohol five times. He was given four enemata of warm beef tea, of 1 pint each. He drank 120 ounces of ice-cold apollinaris water. The only medicine used was strychnine sulphate, one-fifteenth grain.

Eleventh day, beginning 5 a. m. October 30, ending 5 a. m. October 31.—The patient was slowly convalescing, nothing especially noticeable occurring, with the exception that the albumen had decreased to one-half of 1 per cent, he having passed 2,285 grams of urine, having a very light odor, a slightly acid reaction, sp. gr. 1.012, and one-half of 1 per cent moist albumen present.

His diet was 2 ounces of chicken broth, 4 ounces of prepared malted milk, 58 ounces of boiled cow's milk, ice cold; 32 ounces of ice-cold water, and he ate 5 ounces of ice cream. One-fifteenth grain strychnine sulphate was given by the mouth.

Twelfth day, beginning 5 a. m. October 31, ending 5 a. m. November 1.—He was getting along very well; the only thing that seemed to trouble him was the eruption, which was still present and very itchy; otherwise he slept most of the day, and had to be wakened to take his medicine and nourishment when they became due.

His temperature remained subnormal throughout the day. He was still very weak and a trace of albumen was still present in his urine. He passed 1,737 grams of urine of a pale straw color; very slightly acid reaction; sp. gr. 1.011, and a trace of albumen present. He had six actions from his bowels, all liquid and of a greenish color. To alleviate the itchy sensation caused by the eruption, he was washed over with a saline solution and afterwards powdered with magnesia carbonate.

The diet was as follows: Two soft boiled eggs; 64 ounces of boiled milk, ice cold; 4 ounces of ice cream. He was given an enema of one-half pint of beef tea, and he drank 10 ounces of ice-cold water. The medicines given were strychnine sulphate one-fifteenth grain; 5 tonic pills (composed of iron, quinine, strychnine, and arsenic). He was also given one-half ounce spiritus frumenti; an enema of warm water, 1 pint, and magnesia sulphate, one-half ounce, was also given.

Thirteenth day, beginning 5 a. m. November 1, ending 5 a. m. November 2.—The patient was doing very well and the only thing that was necessary was nourishment and stimulation. There was still a trace of albumen in the urine, which persisted up to the seventeenth day, then disappeared and was never found again. The eruption lasted eleven days, from the tenth to the twenty-first day, when it gradually faded away.

The patient was weighed on the 6th of November, after eighteen days of illness, and it was found that he lost 34 pounds.

As far as records go, it is believed that this is the first authenticated case of grave yellow fever where the patient had black vomit was treated with the Sanarelli serum, and recovered. Another case of yellow fever in Havana, H. S., was treated with the same serum, but the disease was so mild in this instance that perhaps the patient would have recovered without any medical treatment.

In the present case 60 c. c. of Sanarelli serum were injected subcutaneously before the end of the second day of the disease, in 20 c. c. doses. The first dose was given twenty-seven and one-half hours after the chill, the second dose nine hours and forty minutes later, or thirty-seven hours and ten minutes after the chill. The third dose was given eight hours following the second dose, or forty-five hours and ten minutes after the chill.

Another case, the eighth one of the series occurring during the year, in a laborer attached to the station, was treated with the same serum, but the disease was so mild in this instance that the patient would probably have recovered without any medical treatment.

The ninth and remaining case occurring in a mess attendant attached to the admiralty building, was admitted on November 21, presented a mild course, and was discharged to duty on November 30.

REPORT ON WORK OF THE U. S. S. SOLACE IN CONNECTION WITH RECENT DISTURBANCES IN CHINA.[1]

By Jacob Stepp, *Assistant Surgeon, United States Navy.*

I have the honor to submit the following as a summary of the voyage just ended, as, in my opinion, it has been one of unusual interest:

On May 6 a case of contagious eruption that has aroused considerable interest was admitted to the sick list, the following being a synopsis of the case:

A musician, second class; born, Leetonia, Ohio, May 1, 1878; enlisted at Mare Island, Cal., April 30, 1900, was sent on board this ship for transportation to the Asiatic Station on the day following date of enlistment.

He was admitted to the sick list on May 6, with symptoms of varicella.

Upon arrival at Honolulu, May 9, the case was seen by the United States quarantine officer, and in his opinion was one of chicken pox. But owing to the perfect isolation of case in sick bay (which is on upper deck aft) and being the only case of confined illness on board, he thought it best to allow the patient to remain, and granted pratique.

From May 6 to 13 the symptoms increased in severity. On May 13, although the case had not then given the characteristic constitutional symptoms of smallpox, the eruption had assumed a pustular appearance, and there being no naval surgeon at that station I called the quarantine officer again to see the case, and he agreed with me that the patient should be sent ashore, because the wives and children of naval officers were among the passengers, and of the possibility of the patient having smallpox.

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[1] Date of this report is September 17, 1900.

On my return to Honolulu, I was informed by the quarantine officers that the case proved to be an attack of smallpox of unusual severity, and they fully expected we would have a severe epidemic before reaching Manila.

My original diagnosis of the case in the medical journal is that of varicella, and was so regarded by the quarantine officers at Honolulu, so much so that they issued to the ship on departure, May 14, a clean bill of health, in duplicate, which stated that there "had been one case of chicken pox on board and no cases of smallpox."

From the onset, realizing the rarity of chicken pox in adults, and the patient having stated that he had nursed chicken pox, and possibly smallpox cases, at a civil hospital at Baker City, Oreg., just previous to enlistment, we observed the utmost care and took every precaution against the spread of contagion.

When first arriving at Honolulu I requested the quarantine officer to receive the patient in a quarantine hospital, but, in his judgment, the patient was comfortable as he was. Later, finding the patient's condition more serious, I called the quarantine officers in consultation, repeated my request, and they consented to receive him.

That there was not an epidemic of smallpox on board, I can only account for by the fact that every direction was carefully and thoroughly carried out by the hospital steward and his assistants.

The patient was isolated in the sick bay and attended by a nurse. The walls, furniture, and floor were frequently washed with mercuric chloride solution, 1–2000, and after visiting him every precaution was taken against the spreading of contagion by bathing and changing clothes and using antiseptic solutions freely.

The nurse in attendance kept the vesicles painted with a lotion of—

Acidi carbolici	4
Glycerini	40
Alcoholis et aquæ	400

I vaccinated, on May 5, 100 officers and men who seemed to require it. The total percentage of success with the vaccine points was 3. This percentage being so low, I purchased through the quarantine officer 70 tubes of glycerinized virus of standard quality, this being all obtainable.

With this latter I again vaccinated the previous unsuccessful cases, together with unvaccinated cases, with better results, the percentage being 7.96.

We left Honolulu May 14, and on May 24 the hospital apprentice, who was the nurse in attendance, was admitted to the sick list with similar symptoms, but very much milder in form.

The same precautions were at once observed, with the result that the disease ran a very mild course, the patient being thoroughly free from symptoms on June 4, and by carefully keeping the vesicles painted with above lotion patient recovered without any pittings.

Since that time no more cases of contagious eruption have appeared.

On arriving at the next station, the harbor of San Luis d' Apra, Guam, Ladrone Islands, May 29, we were boarded by the quarantine officer, who refused pratique during our stay.

We arrived off Cavite, P. I., June 5, there being no particular incident since leaving Guam.

On June 12, while at Cavite, hurry orders were received to immediately proceed to Taku, China, with Major Waller's command of marines. This trip was uneventful to the medical department, the marines rarely appearing at sick call, and on physical examination I found them to be in excellent condition for the field.

On the night of departure 20 patients were received from the United States naval hospital, Cavite, and from the ships in the fleet for transportation to the United States naval hospital, Mare Island, Cal.

Upon arriving at Nagasaki from Taku, June 22, telegraphic orders from the commander in chief were received to transfer patients to the United States by mail steamer, which were immediately obeyed upon the arrival of the Occidental and Oriental steamer *Coptic*, that being the only available vessel.

I went in company with the paymaster, inspected and secured quarters, and made arrangements with the ship's medical officer and steward as to good food, diet, and medical treatment, which they promised to furnish.

The *Solace* again sailed for Taku July 8 and arrived July 11, nothing of importance occurring.

At 9 p. m. July 14 I received the following orders from the commander in chief, dated U. S. F. S. *Brooklyn*, off Taku, China, July 14, 1900:

"SIR: In addition to your present duties, proceed at once to Tongku, China, and report there to the commanding officer of the U. S. S. *Monocacy* for transportation to Tientsin. Upon arrival at the latter place, report to the colonel commanding First Regiment of U. S. Marines for such temporary duty as he may assign you."

Upon arrival at Tientsin, July 15, I reported to Colonel Meade, who ordered me to the United States naval field hospital in the city, where I reported to Surg. O. D. Norton, U. S. N., who at once placed me on steady duty.

Here I was on duty almost continuously, until ordered to return to the *Solace* July 19, with sick and wounded officers of the Ninth U. S. Infantry and U. S. Marine Corps.

Taking the necessary supplies, the sick and wounded were placed on a small junk and towed down the river to the ship, where we arrived the next morning.

On the day following my return (July 21) wounded men of the Navy, Marine Corps, and Army were received on board, numbering 18.

On July 25, 58 more wounded men were received. This made a total of 95 on the sick list; 84 being wounded and 11 sick.

At the time of my receiving orders for Tientsin, I recommended to the commanding officer of the *Solace* that in the probable event of the wounded being sent to the ship, all possible preparations be made for their reception; and on my return I found that all mattresses and cots available in the fleet had been obtained and placed in position.

The wounded unable to walk were carefully hoisted on board in cots. The entire forward berth deck was given up to wounded, as were staterooms on main deck and in lower wardroom, the most critical cases being placed in the sick bay.

From the first arrival of the wounded, and during our stay off Taku, Fleet Surgeon Persons came over daily to this ship at sick call and remained until all wounds had been redressed.

On July 25 Surg. C. J. Decker, U. S. N., reported on board, with wounded received that day, for temporary duty, and on July 28 Surg.

F. A. Hesler, U. S. N., also reported on board for temporary duty and passage to Guam, Ladrone Islands.

The ship left Taku for Nagasaki on July 29 and arrived August 1. Immediately upon arriving I was obliged to make requisition for surgical dressings, medicines, and hospital stores, to replace the supply nearly exhausted by extraordinary expenditure in the care of the sick and wounded of the Navy, Marine Corps, and Army.

On August 2, 6 of the Ninth U. S. Infantry and 8 of theFirst Regiment U. S. Marines, having fully recovered from their wounds, were returned to duty, sailing for Taku on the U. S. H. S. *Relief* on the morning of August 3. On August 6 the U. S. Army transport *Thomas* having arrived, all the remaining sick and wounded officers and men of the Ninth U. S. Infantry were transferred to her for passage to San Francisco, Cal., with the exception of three cases, which were not, in my opinion, sufficiently recovered to withstand the journey. The latter were transferred to the United States naval hospital at Yokohama, with 12 sick and wounded of the Navy and Marine Corps, on August 10, the day following our arrival at that port. On that day Surg. C. J. Decker, U. S. N., was detached, to return to duty.

We left Yokohama August 11 and arrived at Guam, Ladrone Islands, August 17, where Surg. F. A. Hesler was detached on the following day, that also being our date of departure.

We arrived at Honolulu, H. I., September 1. Here we received the musician, second class, from the United States military hospital, with a letter from the surgeon, stating that the patient had recovered from smallpox, and was then suffering from chorea.

At present he is very much improved.

On our return trip, patients, in addition to the number before mentioned, were received as follows:

From *Brooklyn*, at Nagasaki, 1 sick; at Taku, 2 sick.
From *Newark*, at Taku, 1 sick, 3 wounded.
From United States naval hospital, Yokohama, 10 sick.
From United States naval hospital, Guam, Ladrone Islands, 1 sick.
From United States military hospital, Honolulu, H. I., 1 sick.

The above, in addition to those remaining on board, made a total for the United States naval hospital, Mare Island, Cal., of 34 patients, which were transferred on the 15th instant.

It was absolutely necessary during the voyage to prescribe for certain cases special diet. Many of these were the wounded of the Ninth U. S. Infantry.

Although the few cases of contagious diseases that have occurred on board have been treated with excellent results, in my opinion, a special place for such cases should be installed on board.

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1895-1900